

Michael Coney • Hal Clement • Le... dler

Galileo

MAGAZINE OF SCIENCE & FICTION

SPECIAL
DOUBLE ISSUE



David Wilson
on
Bicycling in Space

11 & 32

\$2.95

TWO GIANT STEPS FOR SCIENCE FICTION



by Glen A. Larson and Robert Thurston

The greatest space epic ever—from ABC-TV and Universal—now launches the greatest science fiction novel ever. A thrilling interstellar adventure about a mammoth spaceship and its heroic crew battling a vicious enemy from one end of the Universe to the other.

\$1.95 paper



An Incredible Odyssey into the Stars
by Samuel R. Delany, author of *Dhalgren* and
Howard V. Chaykin, illustrator of *Star Wars*

Two of the most talented people in science fiction today present the first all-color visual science fiction novel published in America. It has all the excitement of SF adventure and all the drama of stunning visual effects. And its story, set in the 61st century, is a monumental tale of two young rebels in search of freedom—no matter where their search takes them.

\$9.95 paper

Available wherever
paperbacks are sold.

BERKLEY BOOKS



FREE
STAR TREK PLAQUE
FOR NEW MEMBERS
ONLY!

ANY 4 BOOKS FOR 10¢ WHEN YOU JOIN

Here's How The Science Fiction Book Club Works:

Savings start when you join. Once your application for membership is accepted, you'll receive your choice of any 4 books on this page for only 10¢ (plus shipping and handling), and your free Star Trek™ plaque. If not delighted, return them within 10 days. Membership will be canceled and you'll owe nothing.

You get 2 selections every month of up to 75% off publishers' prices. About every 4 weeks (14 times a year), we'll send you the Club's bulletin, *Things to Come*, describing the 2 coming Selections and a variety of Alternate choices. If you want both Selections, you need do nothing; they'll be shipped automatically. If you don't want a Selection, or prefer an Alternate, or no book at all, just fill out the convenient form always provided, and return it to us by the date specified. We try to allow you at least 10 days for making your decision. If you don't receive the form in time to respond within 10 days and receive an unwanted selection, you may return it at our expense.

After joining, take as few as 4 books in the coming year to keep your membership privileges. As a member you need take only 4 Selections or Alternates during the coming year. You may resign any time thereafter, or remain a member as long as you wish. At least one of the two Selections each month is only \$1.98 plus shipping and handling. Other extra-value selections are slightly higher but always much less than Publishers' Editions. Send no money. But do send the coupon today!

U.S.S. ENTERPRISE

© 1977 Paramount Pictures Corporation

Full color on metallic background—the 7" x 5" rectangular plaque is sure to become a collector's item.



9632 The Hugo Winners, Vol. 1 & 2. Grant Tinker volume of 22 award-winning stories: 1955 to 1972. Asimov introduces each. Pub. ed. \$15.45.

4455 Three Hallelujah Novels. By Ursula K. Le Guin. One of SF's major talents explores the isolation of humans in alien worlds in *Rescuee's World*, *Planet of Earth* and *City of Windows*. Comb. ed. \$23.85.

2366 The Star Trek Reader IV. Adapted by James Blish. 12 more serialized episodes from the award-winning TV series—plus the full-length novel *Spock Must Die!* Pub. ed. \$9.95.

9337 Again, Dangerous Visions. Harlan Ellison, ed. Short stories and novels, 45 in all. Explicit scenes and language may be offensive to some. Pub. ed. \$12.95.

2362 Dying of the Light. By George R. R. Martin. A mesmerizing story of human destiny among the stars. Pub. ed. \$2.95.



0372 Captain of the Mire's Eye. By Alan Dean Foster. The further adventures of Luke Skywalker and Princess Leia Organa. Pub. ed. \$7.95.

0481 Time Storm. By Gordon R. Dickson. A major novel by one of SF's best writers. Gripping adventure and fascinating ideas set in a vast scope of time and space. Pub. ed. \$9.95.

9414 Metastasis. By Clifford D. Simak. An archaeologist discovers time trails in his backyard. By the author of *A Heritage of Stars*. Pub. ed. \$7.95.

7510 The Starchild Trilogy. By Frederik Pohl and Jack Williamson. Collected as a trilogy and together here for the first time are 3 classic tales: *The Heats of Space*, *Starchild* and *Regan Star*. Special edition.

4729 Gateway. By Frederik Pohl. Travel as alien shows to distant parts of the universe—with no guarantee of return. By the author of *Martian Force*. Pub. ed. \$8.95.



2295 The Sound of Shimmers. By Terry Brooks. A massive quest novel at the very best of modern traditions. Pub. ed. \$22.95.

4457 Dreamsnake. By Vonda N. McIntyre. A haunting story about a desperate healer in a future world that's been devastated by nuclear war. Pub. ed. \$8.95.

6379 A World Set On Fire. By Larry Niven. A black hole in space sends Jerome Corbett 3 million years into Earth's future where the ultimate battle of the sexes is raging. By co-author of *The Man in God's Eye*. Pub. ed. \$7.95.

2352 The Illustrated Roger Zelazny. Edited and adapted by Byron Preiss. A full color, lavishly illustrated edition of stories including a Nebula Award-winner. Large paperback. Pub. ed. \$8.95.

4440 Stellar Science Fiction Stories #4. Judy-Lynn del Rey, ed. Six original stories about alien races, Galactic Empires and intergalactic adventures by SF authors: Stephen R. Donaldson, Alan Dean Foster and others. Explicit scenes and language may be offensive to some. Special ed.

6221 The Foundation Trilogy. By Isaac Asimov. The ends of the galaxy reeled to barbarism. An SF classic. Comb. price \$20.85.



7849 Close Encounters of the Third Kind. By Steven Spielberg. Novelization of the hit movie about Earth's first contact with an alien race. Pub. ed. \$7.95.

5286 Up The Walls of the World. By James Tiptree, Jr. Aliens from Tyne try to escape destruction by transforming their minds into beings on another planet—Earth. Pub. ed. \$8.95.

4490 The Persistence of Vision. By John Varley. Imagination and wit abound in this entertaining collection of short stories by the author of *The Opwicks Hotline*. Explicit scenes and language may be offensive to some. Pub. ed. \$3.95.

6105 The Adventure of the Stainless Steel Rat. By Harry Harrison. 3 thrilling books in 1 exciting volume take to the road the galaxy. Comb. ed. \$15.85.

7831 Galactic Empire. Brian Aldiss, ed. Two-volume anthology of 26 stories by twelve authors. Clarke, Asimov and others covers the Rise and Fall of Galactic Empire. Comb. ed. \$27.90.

2376 The 1978 Annual World's Best SF. Edited by Donald A. Wollheim. Excellent collection of the best short SF stories that year by such talent as John Varley, James Tiptree, Jr., Joe Malderman and Harlan Ellison. Special ed.

2606 Fetus Deeds. By Chelsea Quinn Yarbro. Civilization has collapsed. In search of an idyllic haven, a young woman makes her way across the desolate landscape in the company of a deposed noble's leader. Graphic violence and sex may be offensive to some. Pub. ed. \$7.95.

4507 Star Rigger's Way. By Jeffrey A. Carter. The lone survivor of a space ship's crew and his odyssey to the most dangerous outposts of the galaxy. Explicit scenes and language may be offensive to some. Special edition.

The Science Fiction Book Club

DEPT. SF454, GARDEN CITY, N.Y. 11530

YES! SEND ME MY FREE STAR TREK™ PLAQUE and accept me as a member. Also send me the 4 books numbered in the boxes below and bill me just 10¢ (plus shipping and handling). I agree to the plan as described, will take 4 more books at regular low Club prices during the coming year and may resign any time thereafter. SFBC books are selections for mature readers.

1	2	3	4
---	---	---	---

Mr.
Mrs.
Miss

Address

City

State

Zip

Apt. #

Order not valid without signature. If under 18, parent must sign.

Signature

The Science Fiction Book Club offers hardcover editions sometimes altered in size to fit special presses and save you even more. Members accepted in U.S.A. and Canada only. Other offers slightly in Canada.

24-5151

**YOU GET SAVINGS UP TO 75%
OFF PUBLISHERS' EDITIONS WHEN YOU JOIN
THE SCIENCE FICTION BOOK CLUB!**

Contents

The patters look on indifferently while the heirs of Joseph Penn denounce Lou Shimmer, who is obviously shocked by a Judge-rum of a wounded knee. It bothers Eric the computer, too, who—although on his way into court—is far removed from the space-borne trials of George Greeve and a cyclist named Whitney.

ARTICLES

INTERVIEW: Paul Anderson
by Jeffrey Elliot 12
A quiet man speaks of his art and crafts where he has been, where he is, and where he is going.

HUMAN-POWERED SPACE TRANSPORTATION
by David Gordon Wilson 20
Bigger and better isn't always the answer, particularly when it comes to planning transportation for space colonies. Lightweight, human-powered bicycles and flying machines can do the trick and provide needed exercise.

RED WORLD II
by Hal Clement 28
Mars was a disappointment, but after Jupiter and Earth the next best location in the solar system for life is not the red planet. According to a world-builder of some repute, Hal Clement, the next best spot for life isn't a planet at all.

WHO WAS OLAF STAPLEDON?
by Leslie A. Fiedler 34
The number of narrative voices which appear in his writings reflect the protean character of Olaf Stapledon—a man whose personality eluded any facile categorization.

CLONING
by Justin Leibler 38
Science Fiction has already explored countless uses for human clones from standby bodies for surgical repair to a lateral form of immortality. But none of these may be possible.

2 GALILEO



STORIES

CROSSWHEN
by John Kessel and Terry Lee 42
The incredible conclusion of a space odyssey of love, hate, revenge and redemption.

PENNY ON A SKYHORSE
by Michael Coney 49
They were straight out of the myth of Pegasus, flying horses with a wingspan greater than a sling glider. But these alien creatures of breathtaking beauty might be doomed.

CHANGELING
by John Taylor 57
Frontiers can be tough on marriages. George could survive in the hard vacuum of space without a suit, but

could he survive the loneliness without a wife to come home to?

THE HEIRS OF JOSEPH PENN
by M. Lucie Chin 63
The link forced Martin to balance the emotions of eight clone brothers at one time. Keeping his own identity intact within that soap of human feeling was both the problem and the solution. It was like living in an eight-sided prism—or should that be prison.

CALLING SHAPES AND BECKONING SHADOWS
by Eugene Potter 72
Can the measure of a man be codified like the capacity of a machine? Was he an extension of his bike, or was the bike an extension of himself?

MARATE AND THE BEAST
by Dona Vaughn 78
Some things were facts of life. The beasts were one. Vicious and unpredictable, they were just as willing to kill their own kind as to eat.

DUE PROCESS
by D.C. Poyer 83
What constitutes self-awareness? Is it intelligence? Logic? The ability to draw conclusions from observable facts? Emotion? A skill or talent imparted through millennia of evolution? Or is it something else entirely...

NOBODY LOVES A MOEBIUS STRIP
by Alice Laurance 92
How could a wriggly, wrinkled creature resembling a one-sided strip of bacon be intelligent?

IN AN ALLEN WOOD
by John Kessel 95
Revenge was not enough to keep him alive in this jungle. His survival depended on a beast he could no more understand than the beast within.

ONLY HUMAN EYES CAN WEEP
by Cynthia Felice 100
He had loved the spirit of the women. It was her spirit that haunted him when she was gone. In the end, was it her spirit that survived?

TAKE MY PLANET—PLEASE!
by D.L. Borengasser 110
A comic who had lost his sense of humor was sad enough; a woman who had never found it was worse; but worst of all were those sad aliens who had never imagined what laughter was.

DEPARTMENTS	
STAFF & PUBLISHER'S NOTES	4
The battle continues.	
EDITORIAL	6
It's about time ingenuity instead of horsepower is used to shape the future.	
PROFILE	8
Words about the people who write them.	
SF ANSWER MAN	19
Who knows what questions lurk in the parts of fans...?	
THE ALEPH by Andrew Adams Whyte.....	115
New books November thru February.	
ENTERTAINMENT by David Gerrold.....	124
Rabbits and hobbits.	
TELESCOPE	127
Our future foretold.	
A MOVING EXPERIENCE	127
2020	128
It's a bird!	
GAMES by Marvin Kaye.....	130
Bionic brawn and space chess.	
REVIEWS	132
Books worth talking about.	
BESTSELLERS	137
OPINION by Robert Silverberg.....	138
The ghetto is crumbling—watch out for urban renewal.	
INQUISITION	142
Letters a thru b.	
CLASSIFIED	143
From bazaar to bizarre.	
STAR CHAMBER	144
A world builder joins the staff.	
ADVERTISERS	
Berkley.....	1c
Doubleday.....	1
Ariel.....	5
Galleo.....	5
Elan Vital.....	9
St. Martins.....	11, 17, & 139
Vulcan Cover.....	27
Schabel Games.....	31
Back Issues.....	33
Fantasy & Science Fiction.....	37
Writer's Institute.....	41
C & G Enterprises.....	41
Edmund Scientific.....	123
Avenue Victor Hugo.....	135
Omni.....	140 & 141
GALLEO 3	

Staff

EDITOR

Charles C. Ryan

PUBLISHER

Vincent McCaffrey

ASSISTANT EDITOR

Thomas L. Owen

ASSISTANT PUBLISHER

Thais H. Coburn

COORDINATING EDITOR

Floyd Kerns

PRODUCTION EDITOR

Ron Rouse

SCIENCE EDITOR

Hal Clement

CONTRIBUTING EDITORS

William Desmond

David Gerrold

Karen Shapiro

Andrew A. Whyte

CIRCULATION

Carol Kalish

Dru Kelly

PUBLICITY

Letty Hummel

PRODUCTION STAFF

Steve Bosquin

Ellen Bowler

Cecelia Henderson

Chris Lareau

Elodie Lortiaamm

Susan Rehm

ARTWORK

Larry Blamire

Fred Knecht

Terry Lee

Cortney Skinner

Gustav Szabo

Publishers Notes

Great Caesar's Ghost! Superman would have ended up a neurotic if he had faced the problems we have over the past year. There are no conspiracies here, just simple incompetence. No villainous fiend plots our destruction, just good old Murphy on the job.

A year ago all seemed pretty swell. *Galileo* was selling far better than we could have hoped. The computer company was doing a bad job, but at least 90% of our subscribers were getting their copies, and we had a plan to go to our own computer, step by step, with a new company which, though small, seemed capable. As many of you know, they weren't. We never got our own system, and they went bankrupt.

Our list of some 46,000 names was then given to a temporary service until we could find a permanent home. The company we found is the one we are with now. They told us in early November that we would be up and running in December. We went ahead and put together our November issue on schedule, then our January issue. It was the first week in February before we had our master list. And so it goes...

Now for the good news. You've got the new issue(s) of *Galileo* in your hands. The computers are working, albeit late. We will, indeed, have our

own system soon, but not tomorrow. Between now and then you will be seeing *Galileo* on your local newsstand. Yep, we just could not allow ourselves to be at the mercy of a single computer system any longer. With newsstand distribution added to our subscriptions, we'll be able to buy our way into the best system we can get. It also makes *Galileo* the second largest science fiction magazine as of the June issue.

That July issue will be received by subscribers in late May, and be the first to carry our new cover price of \$1.95 (subscription prices will hold). Newsstand sales require an advanced cover date, but your subscriptions will not skip any issues (computer programmers willing). The interior paper will be going up in quality as well, and we will be able to afford more of the "name" writers (like Larry Niven's new novel "Ring World Engineer"). And most exciting of all, if sales are good, we'll be going monthly in the fall.

We know it has required patience to bear with all this. When you buy a subscription, you don't want to buy problems. But we hope we've made it worth it. We put all we can into *Galileo*; we get repaid by your appreciation. In the end, we hope it is what we do right that counts.

Statement required by 39 U.S.C. 3685 showing the Ownership, Management and Circulation of *Galileo*, published bi-monthly, (6 issues), for September 26, 1978. Subscription price \$7.50

1. Location of known office of Publication is 230 Newbury St., Boston, Mass. 02115

2. Location of the Headquarters or General Business Offices of the Publishers is 339 Newbury St., Boston, Mass. 02115

3. The names and addresses of the publisher, editor and managing editor are: Publisher, Vincent McCaffrey, 313 Commonwealth Ave., Boston, MA 02115; Editor, Charles C. Ryan, 12 Emerald St., Woburn, MA 01801; Managing Editor, Thomas Owen, 39 Dartmouth St., Boston, MA 02116

4. The owner is GALILEO MAGAZINE, INC., 339 Newbury St., Boston, MA 02115. Stockholders owning or holding 1 percent or more of total amount of stock: Vincent McCaffrey, 313 Commonwealth Ave., Boston, MA 02115; Fred Zollo 14 Wilms Ln., Lynnfield, MA 01940; Avenue Victor Hugo Inc., 339 Newbury St., Boston, MA 02115

5. Known Bondholders, Mortgagees, and other security holders, owning or holding 1 percent or more of total amount of bonds, mortgages or other securities are: None.

6. Extent and Nature of Circulation.

7. 39 U.S.C. 362b provides in pertinent part: "No person who would have been entitled to mail matter under former section 4359 of this title shall mail such matter at the rates provided under this subsection unless he files annually with the Postal Service a written request for permission to mail

matter at such rates."

In accordance with the provisions of this statute, I hereby request permission to mail the publication named in the first paragraph above at the phased postage rates presently authorized by 39 U.S.C. 3626

(signed) Vincent McCaffrey, Publisher

	Single issue nearest to filing date	Average No. Copies during preceding months
A. Total No. copies printed	52,446	68,000
B. Paid Circulation		
1. Sales through Dealers and Carriers, Street Vendors and Counter Sales	2,490	3,862
2. Paid Subscriptions	32,300	52,900
C. Total Paid Circulation	34,790	56,762
D. Free Distribution by Mail, Carrier or Other Means, Samples, Complimentary, and Other Free Copies	440	520
E. Total Distribution	34,250	57,082
F. Copies not distributed		
1. Office use, left-over, unaccounted, spoiled after printing	17,036	10,508
2. Returns from News Agents	380	410
G. Total	52,666	68,000

I certify that the statements made by me above are correct and complete.

(signed) Vincent McCaffrey, Publisher

ARIEL BOOKS: SCIENCE FICTION & FANTASY

Introducing the *Ariel* star fleet: large, 9"x12" format science fiction and fantasy books. *Ariel* books are quality books: full-color throughout each volume, exquisitely reproduced on heavy gloss enamel paper and elegantly designed. In addition to the five flagships at right, we have published Corben's *Neverwhere*, *Ariel*, Vols. I-III and the *Close Encounters of the Third Kind* portfolio and calendar. In 1979 we will launch over 20 new titles. *Ariel* books are distributed by Ballantine Books and are available by visiting your local bookstore or by sending check or money order, payable to Ballantine Books, to the following address:

Random House
P.O. Box 100
Westminster, Maryland 21157
Attn: Ballantine Advertising, Dept. G-11



Please rush me the following books. If not satisfied, I may return any book within ten days for a full refund. I have added \$1.00 (for postage and handling of my entire order) and any applicable sales tax to my total.

Enclosed is my check or money order
to Ballantine Books for the amount of \$_____

- _____copy(ies) *Masterpieces of Science Fiction* @ \$7.95
_____copy(ies) *Close Encounters of the Third Kind*,
A Document of the Film @ \$10.95
_____copy(ies) *New Romantic Art* @ \$7.95
_____copy(ies) *Ariel III* @ \$6.95
_____copy(ies) *Sorcerers* @ \$7.95

Print
Name _____
Address _____
City _____ State _____ Zip _____

ARIEL BOOKS



Masterpieces of Science Fiction

A stunning collection of the very best fiction ever written about the future. Classics by Asimov, Bradbury, Clarke, Ellison, Heinlein, Herbert, Vonnegut, et al, all collected in one volume to savor forever. Each story beautifully illustrated with two full page, full-color paintings commissioned exclusively for this publication.

96 pgs., 33 color plates, 9"x12", \$7.95



Close Encounters of the Third Kind

A Document of the Film
Featuring 150 big, full-color movie stills and set photos, elegantly reproduced and designed. Insightful text includes many quotes from director Spielberg, actors Dreyfuss and Truffaut, special effects creator Trumbull, et al. Introduced by Ray Bradbury, epilogue by Carl Sagan.

144 pgs., 150 color plates, 9"x12", \$10.95



New Romantic Art

An innovative portfolio of twelve luxuriously reproduced, previously unseen paintings from this exciting artistic movement. Large full-color plates, suitable for framing, by such top artists as Anderson, Conrad, Hague, Noel and Whelan. The human spirit and imagination unleashed in exotic and sensuous forms.

12 full-color, 12"x18" plates, \$7.95



Ariel, the Book of Fantasy, Vol. III

A new concept in publishing: the ongoing book. While complete in itself, each volume of *Ariel* is part of the entire *Book of Fantasy*, and contains original fiction, poetry, portfolios and incisive interviews, all handsomely illustrated. Featured in *Ariel III* are Ellison, Herbert, Zelazny, Howard, Niven and Kirby.

96 pgs., 61 color plates, 9"x12", \$6.95



Sorcerers

A brilliant collection of fantasy/science fiction art by eleven of today's most passionate artists, with autobiographical text and an extravagant introduction by Ken Kesey. Included are the wildly imaginative visions of Steranko, Kirby, Whelan, Nino, Conrad, Hague, et al. Almost all art in vivid full-color, lavishly designed.

80 pgs., 64 color plates, 9"x12", \$7.95

Editorial

Floyd Kemske



THE WORLD looks to science fiction for a vision of life in the future and perhaps even for guidance in shaping it. So when the world shows a poverty of imagination in the face of certain problems, perhaps some of the blame for it belongs here, in the SF community. In showing the future of man (which, after all, must involve the future of technology), science fiction writers have generally portrayed a world of pushbuttons. And, all too often, the future world without pushbuttons—whenever it has cropped up in the literature—has been the world of barbaric relapse.

It seems that the average man believes the world of the future to be a place where the work gets done automatically, under the pressure of a finger. Our engineers and designers respond to this pedestrian vision by surrounding us with electric can openers, power-assisted nail files, and electric erasers (no, we are not kidding—electric erasers!).

This indiscriminate application of electric motors involves a poverty of the imagination because the most creative use of technology can often involve less power rather than more. The solar-heated home, for example, is generally regarded as some kind of innovation, but it relies on a principle exploited by the citizens of Minoan Crete. Many of us would argue that the four-function electronic calculator is not so awesome as the slide rule. And we almost regret to inform you that—although there are pre-World War I mechanical timepieces still keeping perfect time (we have

personal knowledge of one)—somebody has taken out a patent on a nuclear-powered wristwatch.

Our own favorite area of creative technology is bicycles, which are nothing short of remarkable in this day and age. A consumer can now purchase a super-lightweight bicycle with a frame made of titanium (or aluminum or reinforced graphite fiber) which is stronger than the indestructible balloon-tired godzilla of a bike on which you delivered your newspapers when you were a kid. If you have ever ridden a super-lightweight bicycle, you know that it does not require a whole lot more energy than you use to ride a motorcycle (and many of us, Boston drivers in particular, would say it does not call for as much emotional effort). The super-lightweight is actually on the market for you to buy. You should see the drawing-board stuff, the prototypes, and one-of-a-kinds.

Bicycling engineers are designing recumbents (which are generally safer, more comfortable, and more efficient to operate than traditional bicycles), pedal-powered airplanes (everyone by now has heard of the "Gossamer Condor"), and streamlined road machines of frightening capabilities. At the 1978 Human-Powered Speed Championships in Southern California, a single-rider vehicle without assistance attained a speed of just under 50 mph! Imagine, for a minute, a bicyclist keeping up with your car on the turnpike.

Of course, man can always build an automobile which will win a race against a bicycle (at least on the straightaway), but then again, man can always build an

LED digital wristwatch which the wearer needs two hands to read. And man can always build powered headlight retractors and electronic garage-door openers. The ultimate destitution of the creative faculty, of course, is the *habitual* use of a four thousand pound automobile to transport a two hundred pound person. In that situation, most of the energy is being used to transport the automobile, not the person (who might only weigh one hundred fifty pounds if he would use the automobile a little less).

Yet, when it finally came time for man to begin exploring the surface of the moon, NASA could come up with nothing more imaginative than an extra-terrestrial dune buggy. And this was after the agency had received suggestions (at least one was from a highly reputable scientist, David Gordon Wilson), outlining the advantages of pedal-power on the moon. A pedal-powered vehicle could give the astronauts greater speed, more flexibility, and a lighter payload, all for a minimal output of human energy. But the bureaucrats of the space agency, sharing the average man's vision of the future, decided that exploration could best be achieved with an electric Edsel. These people are charged with the administration of the most imaginative undertaking in history and their vision of the future is the same as that of the average man. Science fiction owes them a better vision than that. And unless we supply it, they will make mistakes beyond the capabilities of the most powerful electric erasers. Self-reliance in a space

[continued on page 139]

Discover your seventh sense... a sense of wonder.

Once upon a time
there was a future. . . .

In that time, there will be
A struggle for the stars,
An assembly of alien allies,
A love spanning time, space, and matter,
A time of play in the fields of the universe;
Humankind no longer alone,
Starmakers,
Space enough for giants.

Once there will be a future of epic adventure,
and infinite possibilities. Those who know it call
it Science Fiction. *Galileo* is the magazine of
that future. The most wondrous science fiction,
and the most daring science fact. *The magazine
for adults who dream. . . .* Publishing masters of
the future like Ray Bradbury, Arthur C. Clarke,
Marion Zimmer Bradley, Hal Clement. Seeking
out the best new storytellers like Robert Chilson,
Lee Killough, Alan Dean Foster, Kevin O'Donnell.
Galileo challenges readers with the newest
scientific discovery and theory, plunging into
such controversies as computer intelligence,
genetic research, atomic energy, and the advent
of private space exploration. *Galileo* is for those
who have discovered the seventh sense. . . .
the sense of wonder. . . . Subscribe today!



Wonderful! Please begin the subscription I have checked below.
My payment is enclosed. [Foreign subscribers add 50 cents per issue.]

☐ 6 issues for \$7.50 ☐ 12 issues for \$12.00

Name.....Street.....

City.....State.....Zip.....

Send to: *Galileo*, Suite F 339 Newbury Street, Boston, MA 02115

Pro-File

Our Authors

This page top: David Gordon Wilson pedals along the Charles River and below are D.L. Borengrasser and Cynthia Felice

On page 10, clockwise from top left: M. Lucie Chiu, Alice Lawrence, and John Taylor



WHAT EXACTLY are the rights of a sentient computer? Are clones really more identical than twins? What is the design speed for a pedal-powered moon vehicle? If these questions have been bothering you, read on because you'll find the answers to all of them in this issue. A broad spectrum of experts and thinkers offers a multitude of new ideas in both fictional and nonfictional form.

For instance—**David Gordon Wilson**. Born in England, and presently a professor at MIT, Dr. Wilson has co-authored *Bicycling Science*, considered the definitive book on bicycling mechanics and ergonomics. He's a well-known proponent of human-powered transport, and, with his students, has designed such unexpected devices as a pedal-powered motor boat. He's also the inventor of the Wilson-Wilkie semi-recumbent bicycle (which he demonstrates to the right), distinguished for its comfort, efficiency, and safety.

In this issue, Wilson discusses the necessity for human-powered transportation in space. And he's got some ideas on space colonies that may surprise you.

We also feature Article by **Dr. Leslie A. Fiedler**. A professor at the **8 GALILEO**

State University of New York, he is best known for his book *Love and Death in the American Novel*. The subject of his essay in these pages is Olaf Stapledon, author of *Odd John* and *First and Last Men*. Fiedler examines Stapledon's roles as philosopher, social critic, and perplexed human being as well as writer. And, he informs us, he is currently writing a book about Stapledon.

Fiedler is probably unique among our writers in that he did not read science fiction as a child. He was, he writes, "introduced to it by my own children." Hmm. But this introduction to the genre, though late, proved fruitful. In addition to his forthcoming critical study, he's recently published both an anthology of SF stories, and an SF novel, *The Messengers Will Come No More*.

Justin Leiber returns in this issue to debunk some common beliefs about clones. (Where is he a professor, you're wondering? Currently, at the University of Houston. And when we published his last article, he was teaching at MIT.)

In contrast to Leslie Fiedler, Justin Leiber was introduced to science fiction by his dad, Fritz. "I grew up in it," he

writes. "My introduction to sex, drugs, and booze came through SF people." Hmm again.

Recently, Lieber combined his philosophical interest with linguistics and psychology to produce a book, *Structuralism*, which speculates about what we humans might share psychologically with other language-using beings—such as computers. And he is using this, plus a multitude of other ideas, in his first novel, which he admits to having started this past summer.

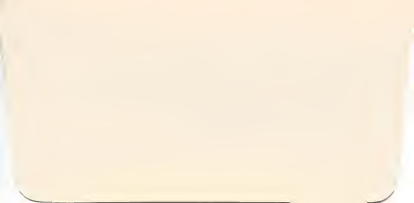
Our next author is also featured in this issue's "Star Chamber"—it's none other than **Hal Clement**. Though best known for such SF classics as *Needle* and *Mission of Gravity* (his own favorite), his greatest influence on the field has been his meticulous world-building techniques. And that's just what he demonstrates in this issue. His subject is Titan, Saturn's icy moon, and "the third most likely place in the solar system to have life of its own." From the few known facts, Clement, who teaches science in addition to writing, builds step by step a plausible world, mentions potential inhabitants, and suggests a planetary idiosyncrasy that might spark a story. It's a great lesson

Authors

GALILEO magazine of Science & Fiction

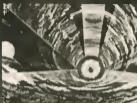
Science and theory are the raw materials, . .
what mankind might do with them is Science
Fiction.

GALILEO is where you'll find it.



WELCOME HOME

Earth; spawning ground of a billion different life forms and the point of origin for the race of beings known as Homo Sapien.
 Earth; more ancient than legend's memory and yet forever revealing a new facet to the mind of imagination.
 Earth; no matter where else in this vast universe we may someday travel, it shall always be remembered simply as "home".



THE ARTS: elan vital: Journal of Creative Adventure is a unique magazine that explores the many dimensions of artistic, artistic and literary creativity along the way.

SPECULATIVE FICTION & FANTASY: We bring you awesome tales from the master story tellers of the age. Legends of galactic conflict and primal power to stimulate the palate of the dreamer in each of us.

THE PHILOSOPHER'S STONE: The most ancient of humankind's ability—that of speculation—has opened wide the doors of perception. Here too, elan vital finds its proper place. Explorations into the fundamentals of thought, politics, knowledge and creativity itself will escort you deep within

the scientific growth that is becoming increasingly conscious. The Journal of Creative Adventure will take you to the very edge of current technology and combine with in-depth articles on such topics as space colonization, laser and biographic development, genetics and the incredible world of R. Buckminster Fuller.

THE ARTS: Appreciation of beauty is indeed a mysterious aspect of the human pattern. With an emphasis upon highly graphic expression, elan vital presents the best in contemporary visual art. Focusing each issue on at least one artist and/or style, mixed with practical "how-to" lessons on a wide variety of craft projects assures our readers a consistent blend of aesthetic theory as well as application.

elan vital: Journal of Creative Adventure is all of this and much, much more. It is the vital force, the creative impulse behind the process of evolution. Come with us on this unique voyage

of discovery and growth. Send for your elan vital today!



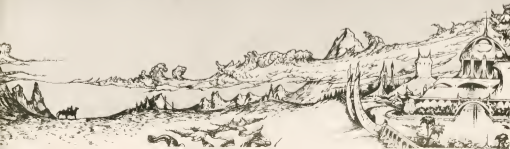
Send for
 elan vital
 Subscription Dept.
 Box 296
 Hemlock Beach, CA
 90254

Sound off! Fill out and mail this subscription form:

☐ 1 YEAR (4 period bound issues) \$9.00 (save \$9)
☐ 2 YEARS (8 issues) \$17.00 (save \$7)
☐ 3 YEARS (12 issues) \$25.00 (save \$11)

NAME _____
 ADDRESS _____
 CITY _____
 STATE _____ ZIP _____
 Total amount enclosed \$ _____
 (payment must accompany order—Thank You)

WELCOME TO THE ADVENTURE!





in world-building, as well as a lesson on Titan.

As a favorite author and influence, Clement gives Poul Anderson. Anderson has, he writes, "made me more careful with my facts—I'd rather not have *him* catch me in a slip." But he adds that the influence is probably mutual.

You may recall John Alfred Taylor as the author of "The Oak and the Ash," a winner in last year's short story contest. "Changeling," his latest offering, concerns a rebellion on a space colony, and a homesick wife.

An English professor at Washington and Jefferson College, Taylor writes more poetry than he does science fiction. "A poem a day keeps the madhouse away," he advises. Over two hundred of his poems have appeared in magazines, and one even "zoomed around as a poster in the 'Poetry on the Buses' program." These poetic tendencies do influence his stories, he says. "I sometimes see a story more as a vision than a narrative."

M. Lucie Chin is back, too, with "The Hens of Joseph Penn," the sequel to last issue's tale about Martin Penn. Martin values his brothers now, but

finds that the price of his new life may be his humanness.

This second story of the Penn series developed after the publication of the book *In His Own Image*. Ms. Chin was fascinated by the public's violently emotional reaction, which "seemed to run to extremes in both directions."

Lucie Chin is a free-lance photographer as well as a writer. In fact, she sent us a picture of herself at work. She claims that many people consider it "thoroughly representative," and cites their surprise on discovering that she actually does have two eyes. But we think it's a great picture—exactly as Cypoleen as a science fiction writer might be.

In his story, "Due Process," D.C. Poyer confronts the same issue that M. Lucie Chin does in hers: what defines a human being? Poyer searches for that elusive requirement in a computer.

However, that's only what we think the story is about; D.C. Poyer thinks it concerns something entirely different. He writes, "It shows how the law, as the representative of society, is going to have to legitimize new scientific developments. . . . The courts have taken over from the Church and from Congress the

power of determining which way society will develop."

In "Murder and the Beast," Dona Vaughn writes about a planet where the men are only savage beasts scavenging their food from the fields of the women. But on some planets, the men are considered human. . . .

Dona Vaughn is a lifelong resident of Texas. She began writing at the age of twelve—a novel, in imitation of *Star Rangers*. This story marks her second sale. She's working on a novel just now (presumably, a different one), but she also spends time raising her two children, gardening, and target shooting.

Alice Laurance offers us an amusing piece called "Nobody Loves a Moebius Strip." What was the source of this story? "My husband," she says, "teaches math."

In addition to writing and editing, Alice Laurance works as Director of Public Relations for Jacksonville University, in Florida. But right now, she's most excited about a mystery anthology, to be called *Who Done It?*, which she is co-editing with Isaac Asimov.

"Due Process" marks Poyer's second story in *Galileo*. His first, "Three Soldiers," appeared in issue #8. In between, he informs us, he's sold "a lot of articles, a new 400-page guide to Virginia, and of course SF." Whew! We're impressed. That's only six months' time.

Michael G. Coney is new to the pages of *Galileo*, but not to the science fiction world. He's published about eight books, of which the best known is *Friends Come In Boxes*. His story in *Galileo*, "Penny on a Skyhorse," is part of his series about the ex-JV star, Carioca Jones. This one concerns her—well, we won't reveal it here. However, we would like to mention that (according to our production editor), "Cholmondeley" is pronounced "Chumley."

Coney was born in England, but has been a resident of Canada for the past eight years. His current hobby is an ambitious one—he's building his own house!

Eugene Potter writes to us that he is pleased to have this opportunity to correct some misinformation published in the previous issue of *Galileo*. He is not a limnologist, he says, but a Miltonist with poor handwriting. He thinks the confusion was probably caused by his reference to a passionate interest in brookwading and specimens

Authors

collecting. As a matter of fact, he says, he spent a couple of years in graduate school counting the semicolons in *Paradise Lost* in a futile attempt to establish himself as a scholar. He is now a university administrator with only the most casual interest in Milton. He believes "Calling Shapes and Beckoning Shadows" is about the synergy of human effort, but he is willing to concede that others might not accept that interpretation.

Cynthia Fellee's novella, "Longshanks," featured in issue #2, was her first story to appear in print. This time she returns to *Galileo* with a bittersweet love story that we think will make at least some human eyes weep. It is a story in the literary tradition of the New Romanticism—a genre that is at once realistic and romantic. As early *Galileo* readers know, Cynthia is something of a modern-day Renaissance woman. In addition to being a science fiction writer, she is the mother of two children, a part-time student, a mountain climber, dog trainer, and equestrienne. Her professional experience includes working as a veterinarian's assistant, office manager, copy writer, secretary, and sales engineer.

Dr. Jeffrey Elliot is a contributing editor of *Starlog* magazine, a professor, and very prolific author. The subject of his interview this issue is **Poul Anderson**—one of the geniuses of modern science fiction. Mr. Anderson is a long time resident of California and multiple winner of the Hugo and Nebula awards. His career spans over a quarter century beginning with the publication of "Tomorrow's Children" in *Astounding* in 1947. He has written at least 50 novels and 250 shorter works—space opera, poetry, high adventure, mysteries, and epics—all with the gracefulness and elegance usually reserved for poets. He is the creator of the legendary characters Nicholas van Rijn, Dominic Flandry, and the Hokas (with Gordon Dickson), and such ingenious fictional universes as the Technic History, the History of Rustum, and the Psycho-technic History. In addition to writing science fiction *par excellence*, he has written numerous articles on Science and the Future, a study of thermonuclear warfare, historical fiction, and translations from Old Danish. He holds membership in the Baker Street Irregulars, the American Association for the Advancement of Science, and is a founder of the Society for Creative Anachronism.

Authors

John Kessel appears in *Galileo* again in his dual capacity as fiction writer and comic strip author. His fiction in this issue is "In An Alien Wood," an unusual love story and moral tale of a man who encounters an alien and in the confrontation must come to terms with his own failed humanity. We asked Mr. Kessel to answer a question about our society's dependence on technology, on the one hand, and the anti-technology movement, on the other. He gave us a very thoughtful, serious reply, but we enjoyed most his final candid comment that, "If everyone would just take a shower with his favorite piece of high-technology hardware once a week, this would be a much cleaner and sexually mature place in which to live."

One of *Profile*'s new faces this issue is D. L. Borengasser, author of "Take

My Planet—Please." Mr. Borengasser denies having an autobiographical connection with the broken-down song-and-dance man of his story, but he does admit to being a salesmanager for a television station in Fayetteville, Arkansas, and to writing jokes for a TV comedian. But, whatever his connection to entertainmentland is, he certainly knows something about the effect of comedy on the human spirit, not to mention alien consciousness. Where, then, did Mr. Borengasser's clever story idea originate? He tells us it came from a suggestion by his wife. A graduate of the University of Arkansas with a B.S. in electrical engineering, he is presently working on an M.A. in English at Northern Illinois University. This is his first published work.

—G—

**Dreams
you'll never want
to wake up
from**

The first collection of short stories by the Hugo and Nebula award-winning author of *The Forever War*, *Minsbridge* and *All My Sins Remembered*—including the 1977 Hugo winner "Incubentia!" that once again displays the brilliance and inventiveness of "one of the best realistic science fiction writers going, maybe the best!"
—Science Fiction Review \$8.95



Buy your book in hardcover from
St. Martin's Press
125 Fifth Ave., New York 10011

Please send me ☐ copies of
INFINITE DREAMS at \$8.95 each
plus 75¢ per book to cover postage
and handling.

Name
Address
City State Zip
Total cost

\$8.95

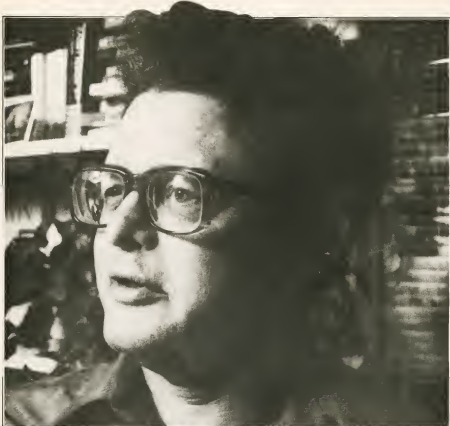


Photo by Richard Todd

ELLIOT: WHY DID YOU become a writer?

ANDERSON: In my case, it was something I drifted into. My ambition was to be a physicist. In fact, I took a degree in physics. Throughout my college years, I wrote a variety of things, mainly as a hobby. Then I graduated into a recession when jobs were hard to get. I thought I would try to support myself through writing while I looked around for work. Somehow, that while got longer and longer, and it eventually dawned on me that writing was what I really wanted to do.

Elliot: How did you find your way into science fiction?

Anderson: I've been an avid reader of it ever since childhood. As a young boy, I wrote a good deal of science fiction, but it wasn't worth much. I never gave

thought to submitting it anywhere. Eventually, though, I came to the conclusion that it was good enough to send in, and it was indeed accepted.

Elliot: Did you start out with the idea of writing science fiction on a full-time basis?

Anderson: Not really. There wasn't any particular moment of conscious decision on my part. I never intended to write science fiction exclusively and, in fact, I've written a variety of other things. There's no question, though, that science fiction has comprised the largest part of what I've done.

Elliot: Did you ever worry at the outset, given the period in which you began, that you might not be able to support yourself by writing science fiction?

Anderson: As a matter of fact, I was faced with that situation on several

occasions. Fortunately, I got other jobs that carried me over until things improved. As a young fellow, I held a variety of jobs. Once I worked in a shop that produced giant rabbits for floats. The longest such period, I suppose, was nine or ten months. That was more than twenty years ago.

Elliot: What was it about science fiction that intrigued you to the extent of wanting to invest your life in writing it?

Anderson: Oh, I suppose there were several things that interested me. I was entranced by the general wonder of science itself. I was excited by the way science fiction brought into focus the marvels of the universe in human terms. It was and is one of the few remaining enclaves of old-fashioned story-telling.

Elliot: Did you have any formal training

Interview:

Poul Anderson

Jeffrey Elliot

Space opera, fantasy, poetry, mystery, nuts-and-bolts—Poul Anderson has done them all and has been collecting prizes and delighted readers for well over thirty years. His latest book, THE EARTHBOOK OF STORMGATE, is on several hardback bestseller lists. It is a part of his Polesotechnic League series which is only one of several series he has created, each one having its dedicated fans who eagerly await each book.

A gentle bear of a man who has lived in California for many years, he attends and speaks often at SF conventions. Always considerate and thoughtful of his fans, he is one of the most popular people in SF and one of the most active. He is a past president of the Science Fiction Writers of America and an active member of the Society for Creative Anachronism, but above all he is a professional writer in the best sense of the word.

as a writer?

Anderson: None whatsoever.

Elliot: Did that pose a problem?

Anderson: I might or might not have done better initially had I had more training. It's hard to tell. There's a saying that's probably true of me, although, doubtless, not true of every writer—namely, that you have to write a million words of unsalable copy before you learn enough to write something that someone might buy. I suppose I approximated that number of words. As I think about it, though, I doubt that formal training would have helped and, I suppose, it might actually have hurt. I've seen quite a number of very promising talents stifled by majoring in creative composition. They get buried under a weight of theory that they aren't yet ready to handle. I dare say,

however, that a few well-chosen courses in English and literature would have helped me a good deal, especially at the outset of my career.

Elliot: Has your background in the sciences proven helpful in writing science fiction?

Anderson: Oh yes, and it continues to be to this day. I'm one of the comparatively few people in the field who writes what is called "hard" science fiction, although that is, of course, not the only sort of thing I do. A knowledge of science has given me a great deal to write about. Of course, this need not be true, and is not true, of everybody else who has a background in the sciences.

Elliot: How would you distinguish "hard" science fiction, especially as you write it, from what might be called

"soft" science fiction?

Anderson: The term itself, "hard" science fiction, originated with the late James Blish who, afterwards, remarked that his original intention had been greatly misinterpreted. Nowadays, what's usually meant by the phrase is writing which is more or less based on "real" science—actual physics, chemistry, biology, astronomy, etc.—and to a considerable extent extrapolates from this, with a minimum of imaginary laws of nature. An excellent example would be Hal Clement's brilliant novel, *Mission of Gravity*, which is a wonderful travelogue through an imaginary planet. In that book, he constructed a new world, while staying within the limits of what he could calculate, what was physically possible. The only assumption he allowed himself which deviated from known science was faster-than-light travel, and that was mainly for the purpose of getting his characters onto the scene. At the other extreme would be Ray Bradbury's classic work, *The Martian Chronicles*, in which the Mars he describes is contradicted by virtually everything we know about the planet. However, he didn't let that bother him in writing the novel. I might say, too, that there's nothing wrong with that approach. Whether a work is "hard" or "soft" has nothing whatsoever to do with its literary merit per se.

Elliot: When you began your career, were there people in the science fiction field who helped you to get started, who worked with you and gave you encouragement?

Anderson: In the beginning, I didn't know anyone of "great" stature. I was influenced by other writers, but they never really helped me. I pretty much made it on my own. Eventually, though, like so many other science fiction writers of that period, I received a great deal of help from John W. Campbell, Jr., who was the editor of *Astounding*, or *Analog*, as it is known today. He was an absolute fountainhead of brilliant story ideas, which he would give away with both hands to anybody who might want to make a story out of them. Usually, when he bought a story, it would be without comment, although if some point interested him, he might write a lengthy letter about that specific point. On the other hand, when he rejected a story, he would often send a detailed letter indicating why he found it unacceptable. Later on, Anthony Boucher, of *Fantasy and Science Fiction*, was also helpful to me, but not

so much in terms of representing a "father image." He had little to say in the way of comments or suggestions, but he was masterful at creating a market for different kinds of stories from those which interested Campbell. He was more concerned with language than Campbell was, and thus encouraged me to experiment with various literary styles.

Elliott: Who were your early "heroes" in the science fiction field?

Anderson: Oh, they were the "greats" who most people list—writers like Campbell, Heinlein, Simak, Van Vogt, Asimov, and Sturgeon, among others.

Elliott: Is there a prominent theme or concept which underlies your work?

Anderson: I don't really know. I don't confine myself to a specific area or approach. I try to be as varied as possible, and not to say the same things over and over again. It would be boring for me as well as my readers. However, there is a basic attitude, I suppose, which underlies my writing—namely, that this is a wonderful universe in which to live, that it's great to be alive, and that all it takes is the willingness to give ourselves a chance to experience what it has to offer. If I preach at all, it's probably in the direction of individual liberty, which is a theme that looms large in my work.

Elliott: Do you see your work as having an important didactic function?

Anderson: Yes, but only in a limited way, and only on specific occasions. After all, the reader is not interested in a bunch of sermons. If he wants that, he can attend church. My main job is to entertain him, to hold his interest as best I can. I do this, primarily, by keeping the story moving. Since stories have a basic content, though, I suppose they're bound to reflect certain philosophical overtones. And so, where I can, I try to say something that I feel is important, such as the need for additional scientific research and exploration. Let's hope that I plant a seed here and there.

Elliott: In writing science fiction, do you feel the need for final answers in science?

Anderson: No. I doubt that there are any "final" answers in science, and I certainly don't feel any emotional need for them. There will always be unanswerable questions. The field is, by definition, inexhaustible.

Elliott: How concerned are you that your work mirror scientific fact?

Anderson: Oh, as much as the story

requires. That does not mean, however, losing respect for the facts. For example, in writing science fiction, I often find it necessary for a spacecraft to travel faster than the speed of light. I try to indicate, though, that this is not because I'm trying to ignore the laws of physics, but because we just don't have all the facts today. There are occasions, however, when I'll write an out-and-out fantasy, which makes no attempt to be scientific. Even there, though, I want it to make sense.

Elliott: How does a story take shape in your mind? Could you say something about the genesis of a story?

Anderson: It depends, really, on the type of story. In a short story, normally, only a limited amount of background and characterization are required, primarily because of a lack of space. In writing a story, though, it's important that the writer know more about his own universe than the reader ever could. Writing a novel is a complicated task. Once I determine, in a general sense, what I'm going to do, I'll sit down and start planning it in great detail. I'll try to figure everything out I possibly can about the world I'm trying to build. After I've calculated the mathematic skeleton of the story, I'll work on several more arbitrary things, such as drawing maps, identifying place names, researching life on the planet. I'll usually end up with pages and pages of closely-written notes, just on that one planet, getting down to elaborate descriptions of flora and fauna. Then I'll start developing individual characters. Here, I'll try to get to the place where the characters can walk through my head without my feeling that I'm pulling the strings. This process helps me to determine the story-line. Along about here, I'll try to sketch the plot, in a general way, not getting too specific, though. I want the characters themselves to govern much of what takes place in terms of the actual story.

Elliott: To what extent does the story surprise you as it unfolds?

Anderson: In detail, quite a lot. I can count on at least one surprise per chapter. In general, not much. I know where the story is headed. But in terms of how it's going to get there, I'm often surprised by what happens.

Elliott: How meticulous are you when it comes to the actual process of writing?

Anderson: Very. I'm one of those writers who tends to sweat over each word. On a good day, I might get 2,000 to 3,000 words of first draft, which

means working from breakfast to dinner, with no break for lunch. I spend the evening going over it with great care, trying to get the language just right. This continues until my first draft is polished to my liking. I'll then let it cool for awhile. Later, I'll come back, look it over once or twice, and then type up the clean copy. That part goes pretty fast, primarily because so much work has been done already. Even then, however, I'll go over it with a fine-toothed comb.

Elliott: Do you follow a set routine when you're working on a book?

Anderson: As I said, I'll usually work from breakfast to dinner. During that time, I keep the door closed; in fact, I get pretty unpleasant if anyone interrupts me. When I'm working, I take the process quite seriously.

Elliott: When you write, do you have a particular reader in mind?

Anderson: Yes and no. Even in the field of science fiction, where there's a high degree of contact between the writer and his readers, the percentage that you ever meet or hear from is very small. A writer doesn't make his money off science fiction fans, but off that anonymous guy he never hears of who buys a book off the shelf. I always try to keep this in mind when I'm writing a book. On the other hand, I value the feedback I get from science fiction fans. They're a great source of encouragement. While I'm working on a book, I'll often say to myself, "so-and-so ought to like this," with a particular individual in mind. But I don't write for any one person.

Elliott: Do you see yourself as "driven" to write, or do you write primarily in order to make a living?

Anderson: As a writer, I try to do the very best job I can. However, I write as little as possible, because there are so many other things in life that I enjoy doing. If somebody gave me a million tax-free dollars, I would probably never write again, at least professionally.

Elliott: Are you concerned with what the critics think about your work?

Anderson: No. I don't write for the critics; I write for those who buy my work.

Elliott: Do you feel that the critics tend to understand your work?

Anderson: On the whole, very little, with, perhaps, a few exceptions. I know a few critics who see what I'm trying to get at. Their rarity doesn't really bother me, though, because there's a substantial number of readers who do.

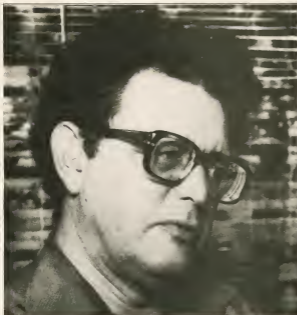


Photo: Richard Todd

Elliot: What accounts for this lack of understanding on the part of the critics?

Anderson: That's difficult to answer. I don't want my comments to sound like sour grapes. Not even Shakespeare speaks everybody's language. You certainly can't expect the rest of us lesser writers to be universally appreciated, even among readers of taste and discrimination. That's something which very few critics seem to understand. They see themselves as qualified to judge the whole body of literature. In the end, though, I suppose that don't the motifs and emphases I treat don't appeal to the personality types who work as literary critics.

Elliot: Are you a harsh critic of your own work?

Anderson: I try to be. I try to do the best I can. I try to live up to my obligations as a writer. That's the most I can do.

Elliot: How would you assess your own work?

Anderson: The late writer and editor, Anthony Boucher, always used to say that the person least qualified to judge a work is the author himself. To a certain extent, I agree with him. Really, only time will tell. These days, though, I mostly accomplish what I set out to do.

I don't do it perfectly, but I do it so that I'm generally satisfied with the finished product.

Elliot: Do you strive to have a particular impact on your readers?

Anderson: Basically, when I write fiction, I'm engaged in the business of telling stories. It's up to me to entertain the reader. After all, my readers give me much more than simply money. That's the smallest part, even though that's what pays the bills. More important, they give me time, which is really the only treasure human beings have when you come right down to it. I have to deserve this somehow. I have to give them as much as they give me. My primary business, first, is to entertain them. Now, this doesn't mean my work has to be devoid of thought. In fact, it's this thought, I believe, which helps to explain the tremendous appeal of science fiction. I like to imagine I've given my readers something to think about, especially my young readers. If I'm lucky, I've given them some new way of seeing the world.

Elliot: What do you think explains your enormous staying power as a writer?

Anderson: I don't know. Of course, I should mention that others are at least

equal in this respect, or more popular. I'm by no means unique; there's Heinlein, Simak, Asimov, and many others. It doesn't surprise me, however, that I've managed to keep going this long. What does surprise me is why so many talented writers fail to make it. I just don't know.

Elliot: What do you enjoy doing when you're not writing?

Anderson: I have lots of hobbies—reading, gardening, traveling, hiking, sailing, conversing, listening to music, and many other things. There's really no limit to the things that are fun to do. There're also many semi-professional things that I enjoy doing—writing letters, translating, poetry, etc.

Elliot: To what extent do you expect the reader to understand the numerous scientific references which you make in your work?

Anderson: That depends entirely on the reader. I try to write in such a way that anybody can follow the story whether or not he understands the scientific references, but that those who do understand them will enjoy it even more. Although we like to think nowadays that everybody understands at least the nuts-and-bolts of science, we know that that's certainly not true. Sadly, most people don't have any idea of what science is all about, including its role in the scheme of things.

Elliot: Humor seems to play a prominent role in many of your books. How central is it to your style?

Anderson: It's very important. In fact, I've written several that were nothing more than comedy. Humor not only provides for relief, but is, after all, a significant aspect of the human personality. In that sense, it's vital in most works of literature.

Elliot: You're known as a master of "puzzle" stories. What is the secret of a good puzzle story?

Anderson: I suppose it goes back to the basic format inherent in the old-fashioned mystery story, of which, incidentally, I've written a fair number. The idea is to set up the problem early on, plant a substantial number of good clues, and then let the reader have the fun of guessing the solution.

Elliot: Many of your books evidence a deep interest in politics. Is there a salient political theme which characterizes your writing?

Anderson: Politics is an inherently fascinating thing in itself. It's also an integral part of life. One way or another, it's bound to show up in science fiction,



Portrait by Richard Todd

particularly when you're dealing with alien societies. In the process of inventing new worlds, it's impossible not to touch on politics.

Elliot: In several of your books, you espouse, either directly or indirectly, the virtues of unrestricted free enterprise. Why do you see capitalism as the most viable economic system?

Anderson: For two reasons. First, it places the greatest emphasis on individual liberty, thereby permitting individuals to reap the rewards of their own labor. Second, in a material sense, it's the most productive system anyone has yet evolved.

Elliot: One of your best-known stories is "Sam Hall," a story which deals with personal unrest and rebellion, the battleground being big government. Why has this story evoked such a tremendous response?

Anderson: Most of the people who read science fiction tend to be individualists in one way or another. They have individualistic personalities, even though they might describe themselves as "liberals" or "conservatives." They tend to be very self-directed people—people who desire to determine the direction of their own lives. I think they

identify with independent characters, such as Sam Hall, who struggles to shape his own life, regardless of social pressures.

Elliot: You are widely heralded as a builder of civilizations. Why did you choose the future history mode in which to work?

Anderson: It just sort of happened. Of course, I was influenced by Heinlein, who wrote a magnificent future history. As far as I know, the future history approach originated with him. He's a superb writer, as well as a wonderful human being.

Elliot: How do you go about minimizing the chaos inherent in writing future histories?

Anderson: It's largely a matter of keeping extensive notes. I have the time scheme worked out almost year-by-year, although there are some parts I haven't yet developed. I keep elaborate notes on individuals, places, events, etc., as they appear. Everything is carefully filed so that I can use it when I'm writing a new story. I try to review these notes to make sure that everything is consistent.

Elliot: Your book, *War of the Wing-Men*, represents a skillful attempt to

construct an entire alien planet, from physics to biology. Indeed, it was one of the first tales in your future history. How did that book come about?

Anderson: Oh, that was a long time ago. It has recently been reissued under its proper title, *The Man Who Counts*. It was my first real attempt at world-building, the sort of thing that Hal Clement does so well. Here, I was interested in meeting the challenge, posed years earlier by L. Sprague DeCamp, who said that he, for one, could not believe in intelligent beings who flew like birds, because muscle power couldn't raise a body big enough to hold the size of brain that would be required for intelligence. In terms of the book, I designed the planet with a very dense atmosphere. It was a very un-earth-like planet. However, I sought to invent a universe in which this was possible.

Elliot: In that book, you penned Nicholas van Rijn, a powerful and remembered character in science fiction. How would you describe him?

Anderson: Basically, he's modeled after certain historical types. I might say, however, that I never write a real person into a story, even with a change of name. Naturally, in creating characters, a writer will draw on his experiences with people in general, as well as with people he's encountered in history and literature. Essentially, van Rijn is a composite of several actual figures who were common in the Age of Discovery—the Renaissance and the Reformation. Physically, he is modeled after King Christian IV of Denmark, who was quite a character. I also drew on Falstaff, Long John Silver, and so on. They all came together in the person of Van Rijn.

Elliot: What about the character of van Rijn appeals to you?

Anderson: He's a real bastard, of course. And yet, he has a certain rascally charm. Also, there's the fact that he's a "superman" figure, but not in the conventional sense. He's old, fat, ugly, gruff. Somehow that tickles me.

Elliot: Many of your books draw extensively on history as well as science. How importantly does history figure as a basis for your story ideas?

Anderson: It's very important. My whole future history series, which comprises a substantial percentage of my work, draws extensively on the past. I've used history in many of my stories. I don't see how anyone can make sense of the present, let alone construct an

imaginary future that makes sense, without having some knowledge of the past.

Elliot: Some critics contend that your portrayal of women, as expressed in books, such as *Trader to the Stars*, reveals a blatantly chauvinistic attitude. Do you agree?

Anderson: It's conceivable that they're right, although I certainly never intended to cast women in that light. Over the years, however, I've learned how to handle characterization better, especially women characters. For a male writer, it's always more difficult to fashion female characters than it is to fashion members of his own sex. In earlier years, I tended to use comparatively few women characters, and usually not to give them leading roles in my stories. That grew out of my fear that I couldn't make them sufficiently plausible. I would like to point out, however, that in this same period, and even earlier, I published a novel entitled *Virgin Planet*, in which women were cast in heroic terms. In that book, a shipwreck took place. For many years the planet was inhabited by nothing but women, who reproduced themselves by artificial means, such as cloning. They viewed men as almost god-like figures until, one day, a spaceman happened to land there. It was the archetypal sexual fantasy, except that the book is all about how this poor silly ass blunders from one situation to the next, always having to be rescued by one or another of the women. In spite of all these seeming opportunities, he never quite manages to make out. The book was intended mainly as a comedy, but I think you could call it an anti-sexist work.

Elliot: Does a character, such as Jill Conway in *Fire Time*, represent a new attitude toward women on your part?

Anderson: Yes. These days, I feel somewhat more comfortable with female characters. It's interesting, but some women have told me that my female characters tend to be so self-confident in recent works that it gives them an inferiority complex. For example, *The Dancer from Atlantis*, is a novel about the kind of women I've met in recent years—strong, independent, proud. In that book, the leading character is absolutely indomitable, regardless of the situation which besets her. *The Winter of the World* depicts a society in which women assume positions of leadership and responsibility. I recently completed a novel, called *The Avatar*, in which two or three of the

Interview

leading characters are women. In fact, one of the women is described as one of the leading intellects of her age.

Elliot: Your writing is distinguished by its emphasis on detailed explanation. What is your feeling about the need for such explanation? How much is necessary?

Anderson: That depends a great deal on the individual story, as well as the reader. In my case, I admit it's sometimes a failing. My characters do, at times, tend to deliver lectures. On the other hand, it's a good way for me to convey a lot of information as background for what's going to happen later. I try to be brief, but I recognize that my descriptions sometimes get hogged down in too much detail.

Elliot: The book, *The Trouble Twister*, is a testimonial to your skill at character

development. Is it difficult to pen believable characters in science fiction, especially where so many of the character types are imaginary figures?

Anderson: I don't think so. After all, people are people. I suspect they'll behave pretty much the same in the future as they have in the past. There's no real difference in constructing a science fiction character as opposed to a here-and-now character.

Elliot: Science fiction has changed a great deal in recent years. Where do you see science fiction, as a literature, going in the future?

Anderson: I don't see it going toward any one place. I like to quote A.J. Badry, who's one of our best science fiction writers. He once remarked, "Trends are for second-raters." I think he's right. As I see it, science fiction,

Fiction reborn here.

ALIENS

Edited by Ben Bova

Murray Leinster's "First Contact"...Clifford D. Simak's "The Big Front Yard"...Arthur C. Clarke's "A Meeting With Medusa"—"an exemplary trio"—*Publishers Weekly* \$7.95

EXILES

Edited by Ben Bova

"These three novellas...deserve to be more widely known" says *Publishers Weekly*. Poul Anderson's "Gypsy"...Eric Frank Russell's "And Then There Were None"...Isaac Asimov's "Profession." \$7.95



At your bookstore or direct from

Gal 1/79

St. Martin's Press 175 Fifth Ave. New York N.Y. 10010

Please send me

_____ copy(ies) of ALIENS @ \$7.95 each _____ copy(ies) of EXILES @ \$7.95 each

Please include 75¢ per book to cover postage and handling (check or money order included)

Name _____

Address _____

City _____

State _____

Zip _____

ever since the Golden Age, when John W. Campbell first took over *Astounding*, has never gone in any one direction. It's gone in all directions, which, I think, is a very good thing. In fact, the dull periods in science fiction have occurred when writers became obsessed with a single motif. At present, we have many fine writers, each one working in a different way. I like that fact. Indeed, more and more, science fiction, as a body of literature, is ceasing to exist. I would like to see the label eliminated altogether. In terms of literary technique, it's becoming more and more like mainstream writing, while mainstream writing is adopting more and more science fiction idiom.

Elliot: Do you still enjoy writing science fiction today as much as you did when you began your career?

Anderson: That's asking me to think back a long way. Basically, when I started out, I was primarily concerned with making a living. I wrote very fast, without too much regard for the literary refinements. Over the years, I've shifted more and more the other way, making a conscious effort to develop a polished literary style. I'm more concerned today with characterization, with trying to get the language right,

and so on. I suppose I read less science fiction today than before. But that's mainly for lack of time. Now my wife helps to steer me on to what's good. I'm still enthusiastic, but my emphasis has shifted.

Elliot: Do you ever feel a sense of competition with other science fiction writers?

Anderson: No. By and large, it's a very friendly field. My feeling is that a good writer benefits all of us, in the sense that he reflects favorably on the entire field. Moreover, he helps us to think about things in new ways, which is all to the good. The more good writers, the better.

Elliot: Are you ever bothered by the isolation, the loneliness, which is such an integral part of being a writer?

Anderson: No, not really. In many ways, writing is a compensation for loneliness. It certainly was when I was in my teens. Besides being stuck out on a farm, I was a very asocial kid, as many writers were. Subsequently, though, I've developed many close friendships and, if anything, my wife and I have more of a social life today than we can readily handle. As for writing itself, I don't feel any sense of loneliness when I'm writing. In fact, I hate it when

somebody opens that study door. There's also this camaraderie among science fiction writers and readers. We meet at conventions, we talk to each other, we form close friendships. Sometimes marriages even result from such meetings; this is how I met my wife. If there's any problem at all, it's how to keep from getting too involved in the social side of it to find time to think, to read, to write.

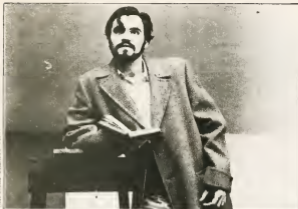
Elliot: Finally, in a recent interview, Ray Bradbury observed that we've moved into a new period, in which science fiction may well become the literature of the future, owing to the tremendous impact of *Star Wars*, *Close Encounters*, and other such films. Do you see that happening in the near future?

Anderson: No. I certainly don't agree with Mr. Bradbury that science fiction is going to become the literature of tomorrow. If anything, it seems much more likely that literature as a whole will simply absorb science fiction, something which has already started to happen. In fact, many mainstream writers, such as John Hersey, are using science fiction idiom more and more in their work. That's because it is common currency now. It's no longer something which only a few nuts are muttering to each other. After all, we're living in an age in which science fiction terms are accepted more or less as a natural idiom. On the other hand, I think that many people will still want literature that deals with ideas and concerns which are more immediate and familiar than those commonly treated in science fiction. As for the social effects of science fiction, I certainly don't think it can save the world. I do think, though, that it can do some things which are positive. For one, it's helping to keep literacy alive in this country, which, these days, is no mean feat. In addition, at a time when some people are ranting about the dangers of technology, science fiction continues to be a voice of reason. Finally, there's no doubt that science fiction plays an important part in recruiting scientists and technologists from amongst the young. In this regard, I've known a good many engineers and scientists who readily admit that science fiction is what first hooked them on the sciences, and helped them to get through all those difficult years of hard work and study that one has to go through. In all these cases, science fiction is a vital and positive force for good.

—G—



Photo by Richard Todd



SF Answer Man

Have a question for the SF Answer Man? Address it to SF Answer Man, *Golden Magazine*, 339 Newbury Street, Boston, MA 02115. The Answer Man says he will make a sincere effort to deal with all serious inquiries. Questions must be typed, in English, on paper. The Answer Man reserves the right to edit them and regards submission as consent to publication. He doesn't pay a dime for the letters he uses, either.

DEAR SF ANSWER MAN,
My husband was missing for a week last May during the height of the fishing season. He says he was kidnapped by a UFO and doesn't remember a thing. I think he is lying. I don't think he was kidnapped. I think he went willingly.

Is this grounds for divorce?

Ms. Imogene Porter
Peoria, Illinois

Dear Ms. Porter,

That you think he is lying is insufficient grounds for divorce. Talk with your lawyer, but in some states infidelity is the only acceptable basis for divorce. It might depend on how he behaved while aboard the UFO.

Dear SF Answer Man,

Ever since the first issue of our magazine came out, people have been giving us a hard time because we named it after a car. What's the matter with magazines named after cars? It's better than naming them after people.

Robert Guccioni
New York, New York

Dear Mr. Guccioni,

I dare you to say that to Isaac Asimov.

SF Answer Man

Dear SF Answer Man,

I was born with this name. I never changed it or anything. So why is Twentieth Century Fox suing me? Also, do you think I can sue them back?

Darf Valder
Ypsilanti, Michigan

Dear Darf,

I don't know. Maybe the Force is not with you.

Dear SF Answer Man,

I have conclusive proof that the earth was visited by extraterrestrial engineers in prehistoric times. My research shows that the height of the great pyramid in feet divided by the length of its base in centimeters when subtracted from the number of rocks in Stonehenge and added to the number of lunar eclipses which have occurred in Muncie, Indiana is nearly equal to the number of hamburgers sold by McDonald's written in base eight notation.

Eric von Heineken
Muncie, Indiana

Dear Mr. Heineken,

As of when?

Dear SF Answer Man,

My young son claims he does not write science fiction, but that he is a fantasy writer in the grand tradition of Kafka and others. I can accept this, but he spends all his time writing short stories in the display windows of bookstores. How can I get him to come home?

California Dreamer

Dear California,

Try offering him a contract to do a film script.

Dear SF Answer Man,

Last year during the height of the fishing season, I was kidnapped by a UFO and I can't remember a thing about it. My wife doesn't believe me and keeps nagging me about it. She says she wants a divorce and I'm afraid I might be pregnant. Do you think this will be covered by Blue Cross?

Kenneth "Nutsy" Porter
Peoria, Illinois

Dear Kenneth,

Give it up, man. Tell her the truth. She'll forgive you.

Dear SF Answer Man,

After the Inquisition I got involved in some really heavy temporal research and I guess I mixed the wrong elements or something because one minute I was in my lab and then there was this blinding flash of light and I woke up in a science fiction bookstore in Boston, Massachusetts. I know you are going to think this is crazy, but there were all these magazines on the shelf and they had my name on them. I don't even remember subscribing. What I want to know is, when do I get my first issue?

Galileo Galilei

Dear Galileo,

Please allow six to eight weeks for us to get your name on the computer.

Dear SF Answer Man,

Over the past few metrons, since the debut of our successful television show, the battlestar has received a great deal of mail, and not all of it subpoenas. Some of the letters have been from so-called "theatrical agents," advancing

[continued on page 139]

Human-Powered Space Transportation

David Gordon Wilson

THIS TITLE has, no doubt, put off most *Galileo* Readers already. "Here is one of those kooks," you will be saying, "who wants to get us to believe that if enough of us strain away at capstans for six months winding up an enormous catapult, we can shoot someone off into orbit. Nuts to that." And I'd have to agree.

So let me clear up any ambiguities right away. I want to convince you of the desirability of some human-powered transportation once a planet has been reached, or a space colony established. Getting there will ever be a high-energy, high-technology undertaking.

More specifically, I would like to discuss the feasibility of pedalled moon rovers, of pedal-assisted guideway transit, and of pedalled air transportation in a space colony.

For these concepts to be worthy of the pages of *Galileo* they should be strikingly novel. Yet I remember sending off a short "pre-proposal" to NASA about fifteen years ago for a study of a pedalled moon rover. I must have been one of tens, possibly hundreds, of people to make the suggestion. The letter of rejection I received had the resigned air of a weary father explaining yet again to his hyper-active son why he doesn't want the family car converted to run on chicken manure. It appeared that NASA had looked at the possibility of making the astronauts use their muscles to make the longer, as well as the shorter, lunar trips, and had turned it down for reasons which were appropriate enough at that time for that mission. In a future

mission, the reasons could favor HPT—human-powered transportation.

Let us look at the advantages of HPT, starting with a familiar base—the bicycle. This evolved gradually over hundreds of years—Leonardo da Vinci drew a stunningly modern-looking bicycle—but most of the significant developments were introduced into the fertile ground of the last quarter of the last century. What really started the extraordinary bicycle boom was the lightweight tangent-spoked tension wheel, credited to James Starley, in about 1876. It replaced the heavy carriage or artillery wheel which, with its solid tire and rigid construction, must have required a macho enthusiasm for the sport of cycling akin to that for bear-baiting. Probably pedal forces of 250 lbf were needed to get these machines moving on poor ground.

Bicycle development exploded after the introduction of the tension-spoked wheel. From the hundreds of configurations, the "Ordinary"—or penny-farthing—emerged as the outstanding favorite for ten to twenty years. The large front driving wheel grew to a size judged to give a good impedance match to the input from human legs. The impedance mismatch between the rider's head and the hard roads of the day was too often a tragic consequence. These two factors—safety and drive impedance—led to the introduction in 1884-5 of the step-up chain drive to a (rear) driving wheel of a more manageable size. John Starley, James' nephew, is given the credit for setting the standard with the Rover Safety bicycle, with its two wheels of equal size and

with the rider sitting securely between them.

Only two further developments were needed. One was the pneumatic tire, invented earlier in the century by a Scot too far ahead of his time to make an impact, and re-invented by his compatriot, John Boyd Dunlop, a veterinary surgeon who developed the tire for his son's tricycle in 1888. Bicycles equipped

with Dunlop tires began winning races by extraordinary margins, and everyone then had to have the new tires. A little later, multispeed gears were perfected, taking the compromises out of impedance matching and providing hitherto unknown power flexibility for hills and headwinds.

The modern bicycle had arrived. In 1895, the Tribune safety bicycle was

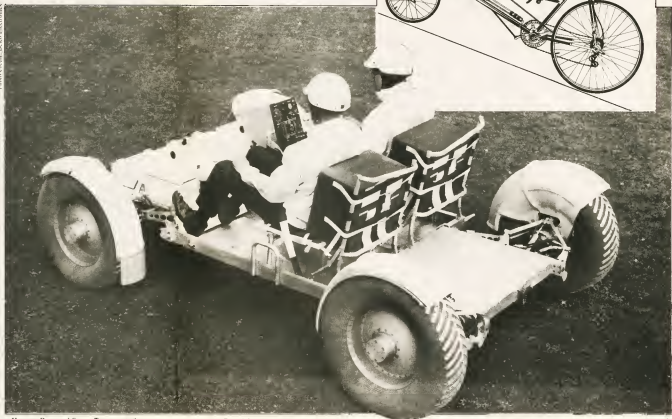
exhibited at the National Bicycle Exhibition in Madison Square Garden, New York, weighing a little under nine pounds ready for the road.

Few would swear by the Tribune's robustness and reliability, however, since modern multi-speed bicycles (the Tribune was a single speed) generally weigh over twenty pounds. But modern bicycles take riders weighing two

Below: Training model of the Lunar Roving Vehicle (LRV) Ascent as the "TG Trainer." It operates substantially as earth.

Inset: Artist's conception of a supereconomy bicycle.

Photo Credit: Deke Electronics



Human-Powered Space Transportation

David Gordon Wilson

hundred pounds for thousands of miles without failures. What other vehicle can take ten times its own weight? Hardly even roller skates. Very light motorcycles are of the order of the rider's weight, and sub-compact cars start at about ten times the weight of the driver. To give similar acceleration, the small electric car tends to be one-and-a-half to two times the weight of a gasoline-powered car, not including the charging system. We would need to have battery-electric drive or something equally massive on the moon. But the performance requirements—acceleration and range—would be far less than for a highway vehicle on earth, considerably decreasing the required power and energy storage.

If we include the fuel cells, solar cells, or nuclear power required for longer missions, we end up with a vehicle-plus-backup-system mass twenty to fifty times that of the driver, or four to ten times the mass of the maximum lunar payload (assuming that this payload might be three to four astronauts plus pressure suits and equipment). This is, then, greater by a factor of about forty to a hundred than the relative mass of an HPT system, even allowing for the presumably greater mass (say 75 lbm—pounds-mass—instead of 20 lbm) of a lunar pedaled vehicle over that of a standard bicycle. Moreover, each unit of mass landed on the moon's surface requires between a hundred and a thousand times as much mass in the launch vehicle. The factors in favor of HPT seem to be growing to a convincing extent.

But would astronauts want to use their energy to propel themselves for short journeys, at least, on the moon? Would the additional fuel requirements cancel some of the savings in the vehicle mass? And what would be the performance of an HPT vehicle in speed and range?

To answer, at least partially, the first of these questions, human beings need exercise, and may have increased need in low-gravity environments. How much exercise is enough for robust health is not known even here on earth. We have to be vague. Some exercise is necessary; more is better, but the gains (in health) are far from proportional.

With regard to food intake, the effects of exercise initially seem to contradict the first law of thermodynamics: exercise at large can depress appetite, although large amounts of work output obviously require an

increased food intake.

Therefore the specification of an HPT vehicle could yield additional savings in launch mass: less food might be needed and in any case the exerciser otherwise necessary could be left behind.

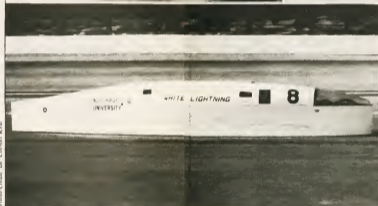
Now for the really interesting question: what would be the performance of an HPT vehicle on the moon? Again, let's look at the common bicycle. The energy losses go three ways: first, mechanical friction in the drive mechanism—so low that it can be neglected for present purposes; second, to wheel-rolling power, which is the principal loss up to about 10 mph; and third, to air drag, which (as speed increases) can rise to ten times the rolling friction.

On the moon, the last and greatest of these, the air drag, is entirely absent. The rolling friction is a function of three factors: the terrain surface, the wheel and tire characteristics (including the suspension), and the vehicle weight. We have very good data on these factors. Dr. M.G. Bekker, one of the leading contributors to the mechanics of wheel-soil interactions and a major participant in the design of the Lunar Roving Vehicle (LRV) used in the Apollo missions, has published estimates showing that the total coefficient of motion resistance of the LRV equipped with toroidal wire-mesh tires was between 0.05 and 0.063. About one-tenth of this resistance came from horizontal deformation of the lunar soil; about a fifth resulted from compaction of the soil; and the balance was tire-flexing loss.

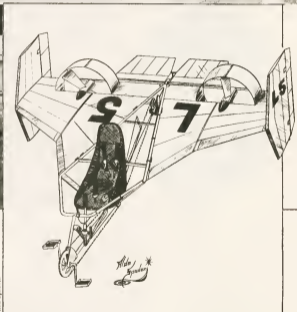
Let us take the resistance coefficient of a hypothetical human-powered vehicle as 0.05—meaning that the total level-surface resistance will be one-twentieth of the normal wheel-to-surface force. And let us assume that the total mass of such a vehicle designed for two people, and taking no credit for the low design loads of a low-gravity environment, will be about four times that of a common bicycle, or 75 lbm. Both of these assumptions are conservative. Lunar gravity is about one-eighth of earth's. If one 150 lbm astronaut uses the vehicle, and if we allocate 95 lbm for the pressure suit and life-support equipment, the total vehicle-plus-astronaut mass would be 320 lbm, making the lunar weight a little under 40 lbf (pounds-force). Now in regular twelve-hour bicycle races the top few finishers produce an average of about a third of a horsepower over the whole period. Assume that astronauts in their cumber-

some suits, with a less effective mechanism for cooling than the wind resistance which both helps and hinders bicyclists, would not want to put out more than one-tenth of a horsepower—55 foot pounds-force per second. This level of effort is typical of an everyday commuting bicyclist, pedalling at his/her comfortable output.

With all these seemingly conservative assumptions (given the low resulting motion resistance), the "cruising" speed for an astronaut, fully equipped, pedalling a two-man vehicle alone across uncompacted lunar soil would be 27.5 feet per second, or 18.75 mph, on level ground. With two people pedalling, the speed would be somewhat higher. If the vehicle were loaded with other equipment for geologic sampling, photography and television, and so



Clockwise from top left: Speed cable drive used on the "Gossamer Condor," the Norton Quadricycle racing at the International Human-Powered Speed Championships of 1929, an artist's conception of a space-orbiting pedal-powered airplane, and the Northern University space tricycle of the 1975 IHPSAC



forth, the speed would naturally be lower. But in any case the unloaded speed seems likely to be higher than the design speed of the powered LRV.

And of course the speed would not be very greatly affected by hills, which would seem to have only one-eighth of the real grade. And because of the absence of the diode effect of wind resistance, one would store more of the

kinetic energy gained on the down slopes than is the case on earth.

Now imagine that a hard road, or even some form of railroad track, could be constructed. The coefficient of rolling resistance is very low for steel wheels on steel rails. Although it would probably be five to ten times higher for wire mesh tires on stone pavement, the resistance would still be much lower

than wheel resistance on earth. For the same vehicle-plus-astronaut mass, 320 lbm, the rolling resistance would be so low that our one-tenth horsepower effort would yield speeds over 100 mph. Some form of guideway with a control system for direction and headway, with the positive braking that this implies, would be necessary if high speeds were permitted and if expensive accidents



Left: Quadrapedal vehicle (Fred Tarch) at IHFSC, 1978.

Below left: Wire Wheel for LRV manufactured by General Motors Delco Electronics Division.

Below: Proton recumbent (Kurt Ziskerns) at IHFSC, 1978.

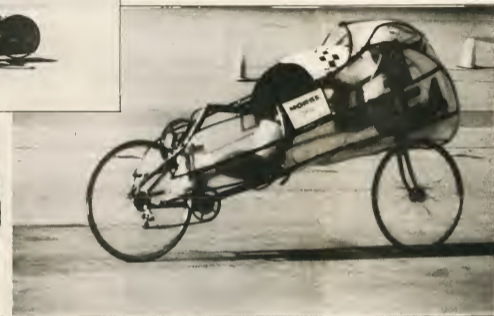


Photo Credit: Dr. Chester Kile

were to be avoided.

With this low rolling resistance as the only loss mechanism, a human being would supply no *much* power to our hypothetical track vehicle. On a smooth road surface, tire-to-road friction would be so low that steering and braking would be inadequate for maneuvers in even mild emergencies at high speed. But at off-road speed, tire-road adhesion would seem to be sufficient for safety, given reasonable driving prudence and few fixed or moving objects to avoid.

The design of a human-powered lunar rover could exploit the freedom conferred by having no wind resistance to contend with. The single track of a bicycle arrangement would have advantages in a reduction in horizontal soil deformation (ball-doing) and soil-com-

paction resistances, but astronauts would have to learn to balance and to maneuver in one-eighth gravity, which might court disaster. Therefore a conventional two-track configuration is likely to be preferred. Dr. Bekker has suggested an elastic-frame articulated vehicle as a possible HPT off-road machine (see illustration). If the surfaces to be traversed are reasonably smooth, a conventional automobile arrangement should be satisfactory.

It seems desirable that the pedalling posture should be sitting, or, as it is known in the bicycle world, "semi-recumbent." Measurements in ergometers show that human beings are amazingly adaptable, and that they produce similar maximum power outputs whether pedalling in a conventional "standing" position on a bicycle,

or sitting in the semi-recumbent posture, or sitting and using the legs in the motion used in sliding-seat racing "shells." If there are advantages in one position and motion over another, logically they should belong to the semi-recumbent style, because it concentrates the reaction of the powerful leg muscles into pelvic pressure on the seat back. The upper part of the body can remain relaxed, or available, for instance, for piloting the vehicle or for other tasks. In the other two motions, the hands, arms, and back are used to take at least some of the reaction from the leg forces, leading to unnecessary fatigue and limiting the control functions which can be given to the hands. The constraints imposed by the wearing of space suits of different designs would need to be investigated.

Human-Powered Space Transportation

Some associates and I have been experimenting with semi-recumbent bicycles with various types of non-circular foot motions. So far I must acknowledge that we haven't managed to improve on the circular cranking motion with a circular chainwheel. Some people prefer the fast motion over the dead centers which is given by an elliptical chainwheel, but no one has been able to

environment of a space colony established on an artificial satellite.

The same low-gravity conditions of the moon would exist, perhaps even lower in level. But these the similarities would end. Instead of wide, rough, almost limitless spaces we would have a compact mostly built environment in which every small area would be important and very costly. There would be an atmosphere, retained by a high envelope, rather similar throughout to earth's atmosphere at sea level. The colony would extend at most a few miles.

To avoid the mistakes made on earth, where a large proportion of the available material and energy resources are dedicated to transportation movement and vehicle storage, personal ownership of vehicles may not be permitted. Perhaps all movement will be confined to walkways and to some combined form of people and goods mover. But possibly we could employ a compromise system, with community-owned small vehicles which can be used and left after use (the Dutch use a "white-bicycle" system in some of their cities—bicycles which can be picked up, ridden, and left by anyone within a defined city area), and a guideway system which the vehicles could enter.

Now bicycles within a reduced-gravity space colony would not be very practical. If the gravity were one-tenth of normal, one would be able to negotiate a turn of given radius at only one-third of the limiting speed on earth before reaching the angle of friction at which one's wheels would slip away. Roadways could be steeply banked, where travel speeds and directions were well defined, but the essential purpose of individual vehicles is to cater for the need of individual speeds and directions.

The reduced gravity would mean, however, that rolling friction and hill-climbing drag would be very small, and that pedalling a vehicle at low speeds would be pleasant for everyone but the aged and infirm. Eight to ten miles per hour would be as high as could be tolerated because of the reduced tire-to-road friction. (Maximum deceleration would be of the order of three feet per second per second—a minimum stopping distance of 37.5 feet would be required from an initial speed of fifteen feet per second, just over 10 m.p.h.)

For the longer-distance "line-haul" travel, a powered guideway would almost certainly be used, if only

because of the substantial space savings which would be possible. This arises from the sensible tendencies of drivers of all vehicles, from cars to supersonic airplanes, to leave a distance between vehicles approximately proportional to the square of the speed. On this account, the capacities of highway, air, and sea lanes reach maxima at rather low speed, and from that point on the capacities decrease with increase in speed. Automatic headway control produces an increase of capacity with speed.

For a space colony, high speeds would be unnecessary and undesirable. Perhaps 30 mph might be chosen. The guideway would have vehicle "slots" moving in synchronism at 30 mph, rather like the hook attachments on the steel cable of a ski-lift gondola system. In fact, for this modest speed, steel-cable (or why not Kevlar?) drive and headway control might be optimum. Or the vehicles could have synchronous motors and cog drive (see illustration). Or the guideway could carry pallets with synchronous drive and control, and vehicles, or containerized freight, could be brought on to the pallets by automatic control.

Then the main trick required would be to merge the vehicles into empty slots smoothly and with no possibility of collisions. At M.I.T. we worked on several accelerators for this duty. One was a variable-pitch, multi-section geared screw, put to one side of the entrance ramp of the guideway and driven by a synchronous motor (same frequency as governs the main guideway drive). The vehicle or pallet would wait at the start of the acceleration lane until an empty slot passed a sensor, when the vehicle's follower would engage the always-turning accelerator screw. Once the vehicle merged into the guideway slot, the line-haul propulsion system would take over—synchronous cog-gear drive, cable tow, constant-pitch screw, or whatever.

Like the variable-pitch screw because a simpler version was proposed by two British engineers, Adkins and Lewis, for the New York transit in 1905. It was eventually built as the "Never-Stop Railway" in Southend, England, in 1923 and later for the Wembley Exhibition of 1924-25. It carried millions of people without an accident, at costs so low that in the second year the fare was eliminated. Why should such a successful system not be adopted? Maybe because it was labelled by "hard-

headed realists" as science-fiction-type dreaming. Even in its crude form it would outperform all but the longest subway lines. Maybe some of these dreams will have to wait for space colonists to show the way.

Another area where man has been dreaming for centuries, and where space colonies may provide the stage for truly fulfilling dreams, is human-powered flight. We have the magnificent achievement by the MacCready team with the Gossamer Condor to show us what is possible. This plane weighed only 70 lbm and had a wing span of 96 feet. The pilot, Bryan Allen, could keep it airborne with an expenditure of only one-third of a horsepower. The cruising speed was 10 mph.

What can we learn from this effort, achieved after centuries of failure? The most important factor was severely practical: the construction method was so simple that the plane could be modified, or rebuilt after one of its many crashes, in a few hours. Many generations of improvements were incorporated in far less time than would have been possible for its competitors. The second principal factor was the low cruising speed.

Human-powered flight on earth is power limited. The power is a function of body weight, but the power-weight ratio tends to fall as weight increases. An athletic male of 150-175 lbs can produce a horsepower for up to a minute, a half-horsepower for something approaching a half-hour, and a third of a horsepower for twelve hours.

The low cruising speed affects the required power input this way. The lift required from the airfoils in level flight is constant, at the weight of the plane plus the pilot. The power output required is the product of the drag and the speed, divided by the transmission and propeller efficiencies. If the airfoil lift-drag ratio is not affected by speed, and likewise if the plane design weight does not increase as design speed is reduced, then the power required for cruise is directly proportional to speed. Lowest power input is therefore required for the lowest practicable speed.

However, airfoil lift-drag ratios decrease with speed, because of low-Reynolds-number effects. Also, for the same lift, the wing span has to increase as the design speed decreases, further increasing the aircraft mass and the total lift required. This is why the Gossamer Condor required a 96-foot wingspan.

Choosing an optimum among all these imprecisely known variables calls for a certain amount of intuition and good judgement as well as analysis, and the MacCready team had better judgement than its competitors. The "viability region" in the multi-dimensional space formed by these many variables is apparently small. Design freedom is therefore small—or, negatively speaking, there is wide design freedom to produce failures.

In contrast, the viability region for design of HPT aircraft in a space colony would be large, and design freedom would be considerable. If the local gravity were one-eighth of earth's, the lift required decreases to one-eighth. For the same lift-drag ratio and the same input power and propulsion efficiency, the speed could be eight times the value of earth—80 mph instead of ten. The relative dynamic pressure of the air would then be 64 times its earth value. The wings, instead of being the dominant feature of the earth aircraft, could be short and stiff. The Reynolds number would be high, and the high-performance sail-plane sections could be used, further decreasing the power input required. This would compensate for the fuselage drag, which would not decrease with the wing-drag reduction. Possibly flying-wing planes with supine pedalling pilots would emerge as being advantageous.

These planes would be capable of aerobatics. A popular sport would be the re-enactment of famous battles of the First World War. Parachutes would probably be unnecessary. An aerial collision would result in both planes and pilots floating gently to the ground. The pilots could pull the cord on inflatable suits, if separated from their planes, and bounce gently off buildings as they waltz downward, looking like Michelin men.

The most dangerous aspect of HPT aircraft would be the tendency of over-enthusiastic pilots to crash into the space colony's canopy. If this is made to withstand micro-meteorites, the planes should bounce off without harm to the canopy. On the other hand, if the philosophy is to allow holes to develop and to plug them subsequently, a mesh crash guard would be needed, which would be expensive.

In a low-gravity environment like that pictured above, all manner of vertical-take-off human-powered aircraft would be possible. For short hops, energy would be saved by gradually building up

rotational kinetic energy and then bounding over to a new location, or perhaps jumping up to one's balcony on the 54th floor of the apartment building. Mid-air collisions, preferably with the blonde next door if one is of the other sex, would become part of the fun of living. It might be that few people would prefer to travel quietly on the ground, and that most would be swooping, hopping, and soaring in the air, bumping each other as if in Dodge cars at a fair, and giving the whole colony the appearance of some exotic-bird sanctuary. It is likely that scientists trying to conduct serious experiments would have to insist on having a screened-off section remote from the squeals and bumps.

The picture I have tried to portray of human-powered transportation in future lunar exploration and in space colonies is far from the slow, tiring, second-class systems to which bicycle transportation seems to have been relegated here on earth. On the moon, the absence of air drag and the very low rolling friction and hill-climbing drag would enable HPT systems to attain speeds probably faster than would be desirable, with comparatively low input energies. In space colonies, the small distances and presumably crowded areas would make high speed disadvantageous. Very low energy inputs would be required to propel small community-owned pedalled three- or four-wheeled cars for short distances. For longer trips, the vehicles could be designed to be capable of being accelerated automatically onto powered guideways, which would carry freight as well as people through very small rights of way.

Perhaps the most exciting vision, however, is the possibility of aerial recreation in all types of human-powered aircraft in the enclosed air volume of a space colony. Here again, HPT would not be relegated to second-class status. It would provide as high a speed as would be allowable, and powered aircraft would probably be banned. The fun of taking part in aerial combat in pedalled flying machines would be worth the price of admission to a space colony. The thought has completely transformed my feelings about living in such an environment. I'm sending in my application to the first expeditionary company which is formed.

—G—

Cover Your Bets

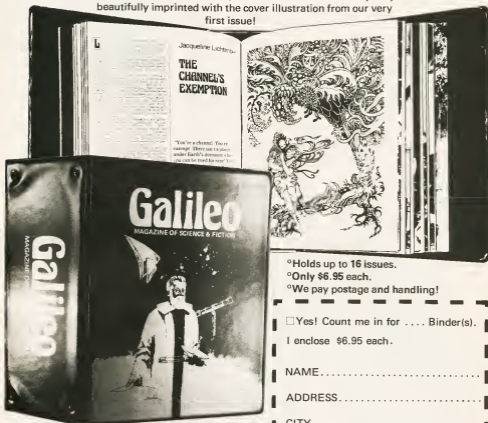
Some people are betting Galileo is going to be around for awhile. We have so few copies left of our first four issues that we've had to raise prices repeatedly to discourage all but the most serious collectors.

Other people just like re-reading stories they liked the first time around.

And then there are those busy types who can never finish an issue before the next one arrives.

So we've got something to help you out.

Cover all your bets with a sturdy protective binder. The heavy vinyl cover is beautifully imprinted with the cover illustration from our very first issue!



- °Holds up to 16 issues.
- °Only \$6.95 each.
- °We pay postage and handling!

☐ Yes! Count me in for Binder(s).

I enclose \$6.95 each.

NAME

ADDRESS

CITY

STATE ZIP

°Order from GALILEO magazine,
339 Newbury Street, Boston MA 02115

Red World 2

Hal Clement

IN SPITE OF a widespread belief, science fiction writers generally don't claim to be recording future, or even past, history; we admit that our stuff is essentially fiction, though we may like to claim that it could have happened—that our scientific background has some validity.

There are, of course, occasional exceptions: most of the UFO literature of the last twenty or thirty years—von Daniken and his chariots-of-the-gods imitators recently—and, for the older science fiction fans, the Shaver "mystery" of the 1940s all come to mind. On what I hope is a higher level, my "Dust Rag" (*Asimov*, September, 1956) was a serious suggestion of a possible explanation for an observed astronomical fact, though done in the form of a story. On the whole, however, we tend to be cautious about sticking our necks out when it comes to saying what it's really like out there.

This is not to say we never do it. We do; it's expected of us, just as we're expected to know what the future is going to be like. However, we tend to hedge when we speak and include a lot of ifs per paragraph. The more cautious of us frequently disappoint our listeners as a result.

I'll try not to be disappointing. I'm going to describe in a fair amount of detail a world which I seriously believe to be the third most likely place in the solar system to have life of its own. I'll try to be clear about where the rather fuzzy limits of our knowledge lie without using a boring concentration of maybes and possibly's. After all, when a man

tells his wife he'll be home for dinner, he doesn't usually bother to add "If I don't have a heart attack or get hit by a taxi." Scientists do get criticized for leaving out these ifs, but not by people who have bothered to learn much science.

I've already written (in *Closetop*, edited by Ben Bova and Trudy E. Bell, St. Martin's Press, 1977) about Jupiter, the most likely world in this planetary system to have native life. Plenty of other people have written about Earth, the second most likely. In the last eight or ten years, there have been a good many articles on Titan, the seventh moon of Saturn, but most of these have been fairly technical research reports. They have been very useful and should be read by anyone seriously contemplating a Titan story on a higher level than *Goddess of Ganymede* or *Chessmen of Mars*. A select few of them will appear in the bibliography at the end of this article, but they are not in science fiction language.

It is not yet time to write a book about Titan with the detail given in Lowell's works on Mars. This may be just as well, considering the fate of the canals. Most of what we have learned about the satellite has come through apparatus which did not involve the human nervous system until the interpretations stage, and even without canals, much of the interpretation remains ambiguous. There is a perfectly good reason for all this.

Mars, pictured to scale, may be imagined as a tennis ball a little over a half kilometer—about a third of a mile—from the viewer. If you mark up a

tennis ball with anything handy and look at it from five meters or so—seventeen or eighteen feet—you'll soon find out where the canals came from.

Titan's diameter is not quite so well known as that of Mars, but as a tennis ball it's about thirteen kilometers (eight plus miles) away at its closest. A thousand-power telescope will pull it in to about thirteen meters (between forty and forty-five feet). Telescopes which can actually make good use of a thousand-power eyepiece are not common; weather conditions which will let them be used that way are also rare; and, through most of my professional life, such instruments have been used more for their light-gathering ability in deep-space research than for work on the planets. Also, astronomers were,

until recently, a rather rare species; of my thousand-member freshman class in 1939, six majored in the subject—and four of these changed majors before graduation, as I remember.

In short, there haven't been too many Titan students until recently, and they've had a much harder job than the Mars enthusiasts.

I don't mean that there have been no visual observations of the big moon; there have. Drawings have been made. Verbal descriptions have been published. Maps have even been made. There seems to have been, I regret to say, a slight feedback between maps and drawings—which leaves both open to some reasonable doubt.

Those of us in the science fiction game who wrote stories about Mercury back in the days when it was presumed

to keep one hemisphere constantly toward the sun have seen this happen before. The fuzzy drawings made of that planet led to the conclusion quite early in astronomical history that it had a one-to-one locked rotation; thereafter, there was a tendency to interpret drawings in terms of the longitude we thought we were seeing at a given time. Mercury's 88-day rotation was part of the accepted data stock until the radar people straightened us out about 1965.

Something similar seems to have happened in the case of Titan, though it is still quite likely that the object really does keep one hemisphere toward Saturn. Several of Saturn's other moons do this, including Iapetus which is nearly three times as far from the planet and exposed to about one twenty-fifth of the tidal force supposedly responsible

for such a lock-in. The evidence in this case does not come from visible surface features, since the moons in question are even smaller than Titan. The features which we would see if our telescopes were better or closer have different reflecting powers, so the apparent brightness of each body changes as it rotates. Photoelectric observations indicate that the change of brightness is periodic and matches the time taken for the orbital trip around Saturn in each case. For Iapetus the photoelectric gear is not needed; there is an extreme difference in brightness between the two sides. At western elongation, when the trailing hemisphere is facing us and the sun, the satellite is about five times as bright as it is half an orbit earlier or later.

With Titan, however, even the photo-



Paul Kuchar

electric measurements don't help. There are features, as the visual observers have reports, and the brightness does vary, but there is apparently no regularity to the variation—neither the sixteen days required for its circum-Saturn orbit, nor anything else.

There is little doubt of the reason for this. The simple fact seems to be that we are not looking at a solid surface with regular features, as with Mars, or even a solid surface with varying features (snowfall and allied phenomena), as in the case of Earth. We are observing a cloudy atmosphere. My own personal bet is that Titan does keep one hemisphere toward its primary, but I can't prove it. If someone wants to give it a different rotation period to meet the needs of a particular story, I'll admit that this is reasonable artistic license, but if I write a story myself which needs a different length of day, I'll go to some other world (this is the need which sent me outside the solar system so early in my professional career).

In any case, the atmosphere is there. There has been no serious doubt of this since the early 1940s, when Kuiper found the absorption bands of methane in spectra of the satellite and convinced his colleagues (by publishing a normally competent scientific report) that he hadn't allowed light from Saturn to contaminate his data. What is much less certain are the amount of methane and the nature and amounts of other gases.

At this point it is tempting to get imbedded in technical detail, but I'll try to resist. Those who want it can hunt down the items in the bibliography. Essentially, we have a lot of unknowns and not quite so many equations. Both the total amount and the pressure of a gas affect its absorption spectrum; the pressure may be due not only to that gas but to others mixed with it; the absorption in long wavelengths produces the so-called "greenhouse" effect, which by interfering with radiation from a planet's surface raises its temperature and that of the immediately overlying atmosphere; the temperature of the atmosphere in turn affects the absorbing power of the gas, sometimes rather abruptly as new molecular transitions become significant, and thereby alters the greenhouse effect; some of the gases present may not absorb in parts of the spectrum which get in through our atmosphere, so we can't be sure they are present on Titan.

We can calculate, step by step, the absorbing factors and temperatures of each layer of atmosphere from highest levels down to the surface as it deals with sunlight, and from the surface back to the outer levels as it deals with the sun-warmed (or otherwise-warmed?) solid body below. We can eliminate solutions which produce radiation patterns—spectra—very different from that observed. Unfortunately, numerous different combinations of gas composition and surface nature lead to the same solution, or as close to the same solution as our observing facilities let us read.

There is either a very large amount of methane or a much smaller amount of methane and a lot of other gas or gases. The only other gas whose spectrum has been identified with fair certainty is hydrogen, and this presents a certain mystery, too.

Titan has a low gravity and escape velocity, though we don't know the exact value of either. Both depend on the mass and the size of a world, and while we have a pretty good value for Titan's mass, its radius is another matter. Remember that tennis ball thirteen kilometers away. None of the various ways of measuring its size has proven very convincing. The estimates range from a radius under 2400 kilometers to over 2900—from about 38% of our own planet's linear size to about 45%, very little smaller than Mars. The mass is very close to 2.3% that of the earth, a trifle over twice that of our moon.

The smaller of the above radii corresponds to a surface gravity about 16% of our own; the larger, about 11.4%. The corresponding escape velocities are 2.7 and 2.5 kilometers per second (earth's is about 11).

This means that even with the lowest believable estimates for Titan's temperature, hydrogen just isn't going to stay around long; too large a fraction of its molecules at any moment are travelling faster than the world's escape velocity. A hardened Creationist would not be bothered by this, of course; he would simply say that Titan was formed with a more-than-average amount of hydrogen a few thousand years ago, and is still losing it. This, however, is like saying that the Michaelson-Morley experiment proves that the earth isn't moving—it ignores too much evidence to the contrary.

A more conventional astronomer, reasonably sure that Titan and the rest of the solar system have been around

for about 4.6 billion years, would examine the possibilities that (1) the estimate of hydrogen quantity is incorrect, (2) there is some mechanism operating to slow down the loss of hydrogen, (3) there is some mechanism returning hydrogen which has been lost, or (4) there is some process supplying hydrogen chemically from Titan's mass. He would also keep, in the back of his mind, (5) something is going on that he hasn't thought of yet.

Number (1) is of course a good possibility. The presence of other, undetected gases such as nitrogen or argon would affect the intensity—more accurately, the width—of the lines in the hydrogen absorption bands. Nitrogen is unlikely on thermodynamic grounds if there is much hydrogen around, since the two would combine to form ammonia, but a similar objection could be raised to the presence of oxygen in earth's atmosphere. Free oxygen is an improbable substance almost anywhere, and demands very unlikely chemical phenomena for its presence in any amount.

Well, as I said, Jupiter is likeliest, earth next, and Titan third.

Argon could be present and indeed probably is present if Titan started out with a significant amount of K-40 in its makeup; this potassium isotope can decay to argon by K-capture.

The second possibility, the slowing down of hydrogen escape, could happen if there were gases present in the upper atmosphere which radiate efficiently in the infra-red, so the entire region is cooled. Such gases exist; acetylene is an example, and there is some reason to suspect that it is present—infra-red emission at appropriate wavelengths has been detected, and reactions starting with the breakdown of methane by solar ultra-violet photons could explain its presence. There are other reasons, which we will get to in a few paragraphs, for suspecting that such reactions do occur on Titan. These might also provide free hydrogen—possibility (4).

Even (3), the return of escaped hydrogen to Titan's atmosphere, has been defended. It has been pointed out that escaping from Titan is not the same thing as escaping from the Saturn system, and that there could be a torus (a doughnut-shaped ring, not a Taurus) of hydrogen around Saturn centered on Titan's orbit rather similar to the one around Jupiter detected by Pioneer X. If dense enough, this could return hydro-

gen to Titan's atmosphere at a rate comparable to the loss. Of course, the torus itself would lose hydrogen, and the various calculations dealing with the appropriate feeding and loss processes make the whole thing seem somewhat unlikely to me, but see the references if you want to check for yourself.

My vote, for story purposes, is for a fairly dense atmosphere at the surface, mostly nitrogen with a fair amount of argon, with significant amounts of methane and hydrogen. The nitrogen is being produced by reactions which I hinted at a few paragraphs back, as is the hydrogen. There is a fairly large amount of ammonia, but at Titan's temperatures too little of this would be in the gas state to show on the spectral records—most of it would be solid.

I can't, of course, claim this is a scientific certainty, but it seems to be within the range of possibilities permitted by combining the observations, allowing for reasonable errors, with the present background of general solar system evolution theory.

Without going into details here, either, I'm putting the surface temperature at 155°K. (This is *Kelvin* temperature, starting at absolute zero with Celsius-size degrees. Kelvin temperature 155° is -118° Celsius, about -180° Fahrenheit. On the Kelvin scale, ice melts at 273°, oxygen at about 55°, nitrogen at 63°, ammonia at 195°, and hydrogen at about 14°). This temperature is due entirely to the sun. There is some internal heat, due to the decay of radioactive isotopes, if we assume that the satellite condensed from a solar nebula at temperatures determined by the sun and a still fairly hot Saturn and therefore consists largely of icy material—including the methane clathrate ice. On this picture there would be a core of heavier elements containing the radioactives, and over the age of the solar system the heat released by these would have melted most of the ice fraction, but not all of it; there would be a solid crust whose thickness is determined largely by its conductivity. It would be thick enough to conduct heat from the melted ices below at the same rate that heat is generated by radioactives in the muddy (since its temperature is far above the melting point of pure water, and the heavy elements would have settled to this level long ago) core. The crust would be a few tens of kilometers deep, composed mostly of ice with some admixture of heavier materials. This contrasts with earth's solid crust and

mantle, made of silicates and nearly 3000 kilometers deep. Such a mostly liquid structure would, incidentally, provide a very good handle for tidal friction and therefore increase the likelihood that Titan was long ago braked into the locked rotation which seems pretty probable anyway. Tidal friction before the braking was complete could have provided enough heat to melt the surface crust as well. Convection currents could have carried small amounts of dissolved or suspended matter derived from the heavy-element core and distributed them through the liquid. In spite of the segregating tendencies of the crystallizing process, some of the salt and mud could have been trapped in the crust when the latter finally froze. In this case, the crust is not pure ice (ice, to planetary astronomers, includes frozen ammonia and methane as well as water and various mixtures and near-compounds of the three). The percentage of elements other than hydrogen, carbon, nitrogen, and oxygen may be small—very small—but I have a subjective belief (I think the current slang is "gut feeling") that it is enough. After all, the earth's crust contains less than a tenth of a percent of carbon, the so-called essential element

of life (personally I'd vote hydrogen into that position), and most of that is in the form of limestone, marble, and dolomite. Titan has plenty of hydrogen and carbon; things like sulfur and phosphorus are what we need to make a convincing possibility for life there.

Their presence is quite believable. First, of course, on *a priori* grounds those elements, like all the others, seem to have been present in the nebula from which the solar system is believed to have condensed. (The Creationist view—it can't be called a theory yet, judging by the Creation Press literature I've seen—offers no basis for a rational guess, but the Creator seems as likely to have put life's essential elements into Titan as to have left them out.)

It would be much better, however, if we could detect some of these other elements directly. As far as I know, this has not yet been accomplished. However...

I did use the term "Red World" in the title of this article, and Titan does look reddish through a sufficiently large telescope. What is the red-colored material?

Whatever it is must be in or above the clouds, or we wouldn't be able to see it. (Polarization data indicate pretty clearly



THE TRIBES OF CRANE

decides if your people will remain in their familiar homeland or begin a journey to new lands as you strive to increase your herds, train warriors and learn of the ancient lost secrets that can move your people toward prosperity and dominance.

The land of Crane is a complete fantasy world with a full range of geography from the permanent ice of the polar regions, to the deserts and tropical forests of the equator.

Cities dot the continents of Crane providing centers of trade and homes for the powerful Shamans and King Lords.

Interaction between players is common. Alliance, trade and combat are possible.

The game's objective is to increase the relative strength and prosperity of your tribe which is measured by different criteria, depending upon the type of tribe and thus obtain points. Players try to obtain high average points per turn thus placing new players on a par with those who have been playing longer.

The Tribes of Crane is a unique correspondence game, allowing for interaction between players and the fantasy world of Crane and each other through a continuous game that may be entered at any time.

As a new player you will start as the chief of one of the many wandering tribes. Perhaps your tribe will be of the Sea people or Caravan merchants.

As chief you will know many secrets of your people and their lands, but there will be much you have still to learn of the lost secrets of Crane. It will be you who



Available from
Schubel & Son
P.O. Box 214648 Dept. N
Sacramento, CA 95821

The Tribes of Crane may be ordered for \$19.95 which includes the first box (contains a rule booklet and all necessary material except where postage). Thereafter, items cost \$4.95 each. First class letter. We hold your name as a guarantee for the magazine. A new issue will be purchased for you if you do not return the magazine for a full refund. A new issue will be purchased for you if you do not return the magazine for a full refund.

that solid or liquid particles, in the form of cloud or haze, are preventing us from seeing any real surface.) This means that the color is in the form of a gas or in the form of aerosol particles. I am a reasonably well-informed chemist, but don't know of any reddish gases which fit the case (and before you start writing indignant letters about bromine and nitrogen dioxide, remember that these both freeze in the neighborhood of 265° K—a hundred degrees or more warmer than the general run of Titanian temperatures).

The probability, therefore, seems to favor the aerosols. The first of these to come to mind is frozen methane in the upper, colder layers of the atmosphere, but this is, unfortunately, not red. None of the simple carbon-hydrogen compounds absorb selectively in the visible part of the spectrum, which is equivalent to saying that they are colorless.

However, there are colored organic compounds, as anyone who has ever seen a tomato or a Dutch tulip farm must realize. What, reasonably, can happen on Titan which would permit the formation of these much more complicated organics?

No, I'm not saying they must be the products of living beings. I think they imply strongly the chemical precursors of life, but that's not the same thing.

Remember the work of a couple of decades ago, when Miller and others subjected mixtures of simple compounds to electric discharges, ultra-violet irradiation, and other energy sources? The basic idea was investigation into the origins of life, which some people still consider supernatural. The results were soups containing various mixtures including, to the delight of the experimenters, amino acids.

Similar experiments have been conducted for the purpose of identifying, if possible, the materials responsible for the coloration in the clouds of Jupiter, Saturn, and Titan. It would be nice to say that something has been found with just the right spectral qualifications, but we can't yet make that claim. Reddish substances did form, coating the inside of the glass reaction vessels and going into solution in the ammonium hydroxide adjunct chamber, but no precise identification of the substances was possible in what has been published so far—or rather, no precise identification of the reddish, brownish, yellowish polymers which seem visually most likely to be the answers we are hoping for.

For my money, it is extremely believable that ultra-violet light from the sun can shatter, and has been shattering, simple hydrocarbon molecules in Titan's atmosphere and has been producing complex compounds of the same general sort which most scientists believe formed on earth a few billion years ago and eventually resulted in life.

This experiment did best when sulfur, in the form of hydrogen sulfide was present; this is theoretically reasonable, since the sulfide would be an efficient UV absorber and tend to make more of the energy in the photons available for chemical action.

I don't, of course, claim that this proves either hydrogen sulfide or life is present on Titan; but neither would surprise me. There is some evidence of infra-red emission in wavelengths suggestive of acetylene in Titan's spectrum; this could reasonably result from photochemical reactions starting with methane—and producing, as well, free hydrogen.

All this could have a bearing on the nature of Titan's surface as well as its atmosphere. Thousands of different kinds of hydrocarbon molecules—and other more complex kinds, if ammonia, phosphine, and hydrogen sulfide are present—could have been accumulating on Titan for billions of years. Most of them would have settled to the surface in time, and even become a major part of the surface material.

We have a general name for such mixtures, though in this connection it may produce a deceptive picture; we call them tars. At Titan's temperatures, the mixtures would not have the qualities of the materials we use to pave streets, nor of those responsible for the fragrance (?) of ash trays; they wouldn't be soft, and they probably wouldn't stink—their vapor pressures would be too low. They may, of course, not even be there; the materials which caused life to appear on this planet were rapidly used up when life really got under way. Once life gave our planet its oxidizing atmosphere, these mixtures couldn't even form any more.

Titan's atmosphere is not—yet, at least—an oxidizing one. To me, however, there is nothing unbelievable about life forms whose biochemistry involves reactions among free hydrogen, unsaturated hydrocarbons, and hydronitrogens, with the sun the energy source. Tars precipitated from the upper atmosphere may form much of

the surface, playing a background role analogous to that of the carbonate minerals such as limestone and dolomite here on earth. The igneous rocks would be ices, with varying amounts of dissolved or frozen-in-suspension salts. With a thin crust and plenty of tidal stress from other moons, tectonic activity should be high. One can see human explorers replenishing their drinking water from the local volcanoes.

The landscape itself should be attractive, or at least interesting (and, of course, should vary with location; let's outgrow the idea that any planet with a solid surface must be the same all over). My guess is that much of it is rugged because of the tectonic situation, and that the surface materials show a broad range of color both from the "igneous" ices and the tars which have precipitated from the sky over the megayears. Erosion will be largely of the wind type, because there seems little chance of much liquid—some mixtures of ammonia, water, and other things may have a liquid range in the 150° neighborhood, but I suspect they'll be found mainly in the tissues of living organisms. I don't swear that there'll be no ponds, but I'm doubtful about rain and rivers. Even with eight-day nights, the temperature won't fall much after sunset, according to at least one set of calculations on the Titanian wind dynamics; the atmosphere seems to be a pretty good heat carrier (though obviously we have no measures of night-side temperatures from earth).

The upper atmosphere is hazy, forming a fairly bright general background to the red-yellow-brown clouds produced by photochemical action. Where the clouds let sunlight reach the surface it is fairly bright; photographers open up a little over six stops. Where the clouds are heavy, it is of course much darker.

The surface may show its natural colors, or be largely covered with some sort of vegetation whose color I can't begin to guess—anything goes, if you're using this for story background.

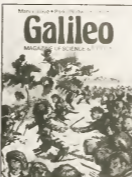
Yes, I've been going pretty far out in speculation in the last few paragraphs. Still, I don't think I'm too far out of line with either the observed facts about Titan itself or with the generally accepted rules of physics and chemistry. As a lover of space opera, I wouldn't mind reading (and I certainly wouldn't mind writing, but I'm not claiming rights) a story in which the overheated

(continued on page 41)



Enjoy the stories you missed
From America's best Science Fiction
Magazine

Back Issues



Most back issues are still available!
But the supply is limited

Order now to complete your set while the supply of first edition copies lasts!

<input type="checkbox"/> Issue #1	SOLD OUT
<input type="checkbox"/> Issue #2, with Clement, Foster, Lichtenburg (almost sold out)	\$6.00
<input type="checkbox"/> Issue #3, with Sagan, Aldiss, and O'Donnell	\$6.00
<input type="checkbox"/> Issue #4, with Ekland, Williamson, and Weston	\$4.50
<input type="checkbox"/> Issue #5, with Bradley, Williamson, and Panshin	\$4.50
<input type="checkbox"/> Issue #6, with Ellison, Cerrold, and Wilder	\$3.00
<input type="checkbox"/> Issue #7, with Leiber, Willis, and Aldiss	\$1.95
<input type="checkbox"/> Issue #8, with Kessel, Kaye, and Poyer	\$1.95
<input type="checkbox"/> Issue #9, with Silverberg, Willis, and Carver	\$1.95
<input type="checkbox"/> Issue #10, with Chin, O'Donnell, and Hensley	\$1.95

Postage and Handling (\$.25 per copy)

TOTAL

Name

Street

City

State

Zip

Order from **Galileo magazine**, 339 Newbury Street, Boston MA 02115

W

HEN STAPLEDON died on September 6, 1950 at age sixty-four, the press seemed uncertain about his exact name or his chief claim to fame. The *New York Times* identified him as "W.O. Stapledon... noted philosopher," the *London Times* as "Dr. Olaf Stapledon, a writer of boldly stated scientific fantasies" and *Time Magazine* as "William Olaf Stapledon, Egyptian-born British philosopher." All three agreed that he had "taken a prominent part in various communist organized international conferences." And the two American journals further observed that he had been "the only British delegate to the communist backed cultural and scientific conference for world peace" held in New York's Waldorf Astoria Hotel in March of the previous year: a fact made much by hostile observers, who kept asking why English philosophy had been represented by "a run-of-the-mill pedagogue of very little reputation," rather than, say, Bertrand Russell.

It is true that as a formal philosopher Stapledon was by no means of first rank, though his first published book, *A Modern Theory of Ethics* (1929) purported to be philosophy, and he continued to produce works of that kind, ever more hortatory and less technical, throughout his career. But before he had quite finished that first book, he seems to have had a vision or revelation which impelled him to deal in its final chapters not with ethics but with what he called, a little apologetically, "ecstasy." Arising only on "occasions of defeat," and in the presence of pain, that ultimate human response transcends both, since, Stapledon assured his earliest readers,

It is possible... to be reduced to quivering incapacity and terror, and yet all the while to be an exultant onlooker... a quiet way about it, it is possible... even while helplessly watching a beloved's pain to [be]... coldly, brilliantly, enlightened, not as to the excellence of pain, but as to the excellence of the universe.

"Ecstasy" proved, however, too subjective and "esthetic" for rigorous philosophical discourse—requiring a mode of exploration possible only in speculative fiction, to which Stapledon turned exclusively for nearly a decade. By the end of the thirties, he had produced the major works which Brian

Who Was William Olaf Stapledon?

Leslie A. Fiedler

Aldiss was to describe in 1973 as "the great classical example, the cold pith of perfection" of science fiction: an estimate to which, in 1975, Robert Scholes—an academic American critic who came only belatedly to SF—was moved to say *amen*. In 1950, however, American criticism was not yet prepared to deal with that disreputable genre, prized chiefly by the semi-literate young. In any case, neither *First* and *Last Men* (1930) nor *The Star Maker* (1937) had yet been published in the United States, in part because of their anti-Americanism. Indeed, when they did appear three years later, Stapledon's more flagrant attacks on our country and our culture had been prudently expunged.

But there had been an early American edition of *Odd John* (1935), since it

could be taken—out of the context of his whole work—as yet another of those superhuman mutant stories loved by the pop audiences of the time, like Philip Wylie's *Gladiator* (1930) or Siegel and Shuster's comicbook, *Superman*. Such an identification, however, did Stapledon little good with the critical establishment, which still regarded all science fiction as "trash," compared with certain experimental modernists whom (to make matters worse) Stapledon had condescendingly referred to in *Odd John* as "the bright young things of art and literature... blowflies of a decaying civilization. Poor wretches! How they must hate themselves really."

But SF fandom did not embrace him either, preferring authors first encountered in the specialty pulp in which Stapledon did not appear, and

Who Was William Olaf Stapledon?



Photo Credit: Mary Duffman Long
From A Fiedler Reader (Eden and Day, 1977)

which indeed he regarded no more highly than did the elitist critics. By 1950, therefore, with his best work some fifteen or twenty years behind him, he seemed to Americans who knew him at all a failed philosopher, one more high-minded academic nobody, exploited by the Communists for their own ends. Yet even at the moment when he was making headlines by declaring his allegiance to the Soviet Union in the Third World War he believed lay just ahead, Stapledon was tormented with political doubts he was unwilling to confess in public, perhaps because American capitalism seemed to him still, as it had from the first, the chief enemy.

But he had always had reservations about the Communist movement, dealing with them in passing in *Odd John*

Leslie A. Fiedler

and at more length in quasi-autobiographical fictions like *Last Men in London* (1932) and *Darkness and Light* (1942). His last thoughts on the subject, however, remained in manuscript until 1951, when they appeared posthumously as *The Opening of the Eyes*—a meditation completed by his wife, to whose "devastating sanity," he once wrote, "I owe far more than she suppresses," and to whom he remained married until he died, despite the lifelong quarrel with bourgeois monogamy recorded everywhere in his work. His final disavowal of Communism is addressed, however, neither to his political comrades nor to the readers of his "scientific fantasies," but to the Christian God, whom from earliest adolescence he had sought to deny:

Above all I spurn the lure that

snarles the comrades, the call of brotherhood in the Revolution and in mankind's seeming progress. There can be no progress but the lonely climbing of each solitary soul toward you.

Even at this point he seems not to have been sure that the "you" he addressed really existed, knowing only that if it did not, the vast universe as well as his own tiny "I" remained meaningless. Nor was he much more certain about the ontological status of that "I." Just as he had wrestled always with the problem of the existence of God, he had wrestled with the problem of the integrity of his own ego, striving to convince himself that the vision of a splintered self which haunted him was not incipient schizophrenia, but a higher wisdom than that available to psychologists—a revelation that we are neither single in ourselves nor finally isolated from each other. His confusion on this score (a confusion reflected in his obituaries) is indicated by the games he played with his name, signing his books sometimes William Olaf Stapledon, sometimes William Stapledon, more often as time went on Olaf Stapledon, or just O.S.

Moreover, for each of his moods—all studies in one sense or another of the divided self—he invented a meta-author, more often than not superhuman, who purportedly speaks through, possesses his all-too-human self for as long as the fiction lasts. "This book has two authors..." *Last and First Men* begins, and though it opens without such a prefatory warning, *Odd John* is also a case in point. Its title page indicates that it is written by Olaf Stapledon; but the first person narrator of the "biography" which follows is clearly someone else: "a half-hearted free lance journalist," addressed throughout by the mutant protagonist as "my dear child" and "Fido." And when we turn back to *Last Men in London*, the confusion is further confounded.

Published in 1932 as a sequel to *Last and First Men*, *Last Men in London* turns out to be very different from *First Men*. On one level, it is more like such confessional books written by pacifists about World War I as E.E. Cummings's *The Enormous Room* or Hemingway's *A Farewell to Arms*. But it purports to be told by the same Neptunian narrator as its icier and more abstract predecessor, and it continues, on another level, the

myth of the End of Man in an indifferent universe. That narrator, visiting the earth of Stapledon's time from two billion years in the future (when the last mutated humans are about to become extinct), discovers among us "submerged supermen,"—gifted freaks who might have changed human destiny, were they not destroyed "by the action of a savage environment."

He describes in detail one such creature called Humpty, "a great loud rather like a grotesque child of eight seen through a magnifying glass." Humpty is seen, however, through the eyes of Paul, a twentieth century school teacher whose career parallels that of Stapledon in many respects. A Conscientious Objector—who, after serving in a Volunteer Ambulance Corps, dedicates his life to working-class education and socialism—he proves powerless to save Humpty from despairing suicide. The final words on Humpty's death are, however, spoken by the Neptunian in his own voice:

Thus ended one of nature's blundering attempts to improve upon her first experimental humanity. One other superior and much more fortunate individual was destined almost to succeed in the task that Humpty had merely imagined. Of this other, of the Utopian colony which he founded and of its destruction by a jealous world, I may tell on another occasion.

Yet when that tale came to be written in *Odd John*, it was narrated not by the "I" who promised to tell it, nor even by Paul—who later goes mad, recovers, marries, has children, and (we learn from the omniscient extraterrestrial) loses touch with him forever, "trapped in the quagmire of senility"—its telling is entrusted instead to the super-obtuse narrator, Fido, newly invented for that express purpose. But it is published under the name of Olaf Stapledon who, we must remember, appeared as a character in *Last Men in London*: a "timid and comfort loving" friend of Paul, otherwise anonymous but identified as the author of *Last and First Men*.

Only if we are aware of all this, can we rescue *Odd John* from the context of other Superman SF—which by now includes not just Wyllie's *Gladiator* but A.E. Van Vogt's *Slan* (1940), Theodore Sturgeon's *More Than Human* (1953), and Arthur C. Clarke's *Childhood's End*, which appeared in the same

year—and return it to the center of Stapledon's unique vision of man and his fictions, where it properly belongs. The ambiguity of authorship, along with the fear of and desire for possession by an extraterrestrial "other" which underlie it, never ceased to haunt him. When he picks that theme up again in *The Star Maker*, he inverts it, to be sure, making his narrator a contemporary Englishman who, in flight from domesticity, enters the minds of alien creatures in remote Time and Space. But both the possessor and the possessed represent still splittings from his divided consciousness, which is yet another way of persuading the reader that both he and the author are experiencing now cosmic events which have not yet come into existence, and indeed probably never will.

Whenever Stapledon writes about a future close enough to have since become our present, we realize how little grasp he had of the real potentialities of politics and technology in his own time. In the 1930s, he did not even foresee the coming of Nazism, imagining instead a war between England and France; and in the 1940s, he thought a drastic decline in population would prove the undoing of the West. Moreover, we have begun to move into Outer Space millennia before he believed it would become possible. What moves us in his work, then, is persuasive paranoia rather than reliable prophecy—an ability to render his private hallucinations so vividly that they become our own. But there is something finally therapeutic about being able to live someone else's madness, or rather to experience in someone else's fiction a madness that might have been ours.

Stapledon's vision of the End of Man, as well as a tragic overview of human destiny so vast and compressed that individual suffering tends to disappear, may have been anticipated in the final pages of H.G. Wells's *Time Machine*. But better than Wells, who was profoundly anti-metaphysical as well as psychologically naive, he understood how vicarious participation in such a vision could alter consciousness right now—destroying received notions of what our ego boundaries are or ought to be. In his fiction, therefore, he represents over and over the dissolution of such boundaries, either by the intrusion of an alien consciousness into an unwilling host, or the voluntary merging of many consciousnesses in a

voluntary orgiastic communion.

Stripped of technological trimmings and SF conventions, Stapledon's stories reveal themselves as a series of variations of quite ancient mythic themes: the myth of the psyche as an area open to invasion by demonic or angelic forces, and of man as the eternal victim of an eternal conflict between his animal inheritance and his spiritual aspirations. Nowhere does he portray the latter more dramatically than in *Sirius*, the tale of a dog endowed with superhuman intelligence, or the former more movingly than in *Odd John*, the account of a utopian community where all dualism disappears when each opens himself to the psychic invasion of all.

Yet both *Sirius* and *Odd John* end in defeat, since however optimistically he may have spoken from the public platform in the name of Marxism, Stapledon was enough the product of a Christian education to have believed that all human efforts to escape the limits of human nature are doomed. Similarly, he was convinced that only by learning to accept and celebrate the annihilation of human consciousness, by "living our deaths," could we attain the state of illumination he called "ecstasy." That such views were rooted in pathology and might lead back to God, he seems to have always been uneasily aware, even as he suspected that there was something masochistic as well as covertly Christian in the abject humility of his human characters when confronted by superior intelligences from nowhere.

I find especially unpalatable in this regard the sick relish with which Fido welcomes not merely the contempt of *Odd John* but the revelations of his criminality: his flaunting, for instance, of the taboos against incest and murder. It is hard to resist believing that the narrator loves his Superman (like Beetle sucking up to Stalky, or some minor bureaucrat praising Stalin)—not despite but precisely because of his brutality. And yet just as he manages by raising the mythological ante to translate the fear of his own death into a cosmic shudder at the inevitable end of all sentience, so Stapledon manages to transmute a shameful rejoicing at his own inadequacy and the strength of those who despise him into the metaphysical thrill possible only to men who recognize the insignificance of the biological adventure called life, as compared to the lifeless eternity which frames it.

—G—

Who Was William Olaf Stapledon?

The biggest
and best issue any
Science Fiction magazine
has ever published!

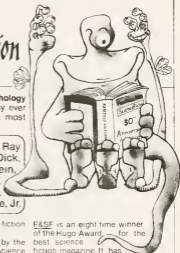
ACT NOW— Reserve Your 30th Anniversary Anthology of

Fantasy and Science Fiction

at no extra cost. . .

Thrill to Fantasy and Science Fiction's 30th Anniversary Anthology—320 pages packed with the best science fiction and fantasy ever published. Over 20 novelets and stories by the most exciting, most inventive SF writers, including:

Isaac Asimov, Brian W. Aldiss, Anthony Boucher, Ray Bradbury, R. Bretnor, Avram Davidson, Philip K. Dick, Thomas M. Disch, Harlan Ellison, Robert A. Heinlein, Zenna Henderson, Shirley Jackson, Daniel Keyes, Damon Knight, Richard Matheson, Walter M. Miller, Robert Silverberg, Theodore Sturgeon, James Tiptree, Jr.



Daniel Keyes' *Flowers for Algernon*, Walter M. Miller's *A Canticle for Leibowitz*, and Alfred Bester's *Fondly Fahrenheit* are just three of the all-time favorites collected here for you. Get this special **30th Anniversary Anthology** made up of the best remembered and most highly regarded classics from the first 30 years of *Fantasy and Science Fiction*, months before the hardcover edition goes on sale. It comes to you at no extra cost as our 320 page October issue, on your subscription to

America's foremost science fiction magazine. Original stories and novelets by the world's most outstanding science fiction writers are just part of what you get each month in *F&SF*. Isaac Asimov's widely read Science column, macabre Gahan Wilson cartoons, illuminating SF book reviews by Algis Budrys, and Baird Searles Film Guide appear in every issue. You'll also enjoy spectacular *F&SF* cover art, puzzles, and reader competitions.

F&SF is an eight time winner of the Hugo Award, for the best science fiction magazine. It has published more Nebula Award winning stories than any other magazine and has won the Locus Poll as the best SF publication, for the past two years. *F&SF* rewards you each month with unforgettable fiction, and unique informative features. **Subscribe NOW**—be one of the first to get your whopping 320 page **30th Anniversary Anthology** at no extra charge.



A 30th Anniversary subscription to *F&SF* makes the perfect gift for everyone who loves to read! Do something different—**Give *F&SF***

Clip this coupon today for your 320 page **30th Anniversary Anthology of Fantasy and Science Fiction!**

Mail without delay to: **Fantasy and Science Fiction,**
Box 56, Cornwall Conn. 06753

Yes! I want to treat myself to a feast of *Fantasy and Science Fiction* at better than 30% savings over the regular newsstand price. Enter my subscription, including the 320 page **30th Anniversary Anthology**, for

☐ 9 mos. for only \$6.97

☐ I want to double my savings—Send me 18 mos. for \$17.94

Enclosed is my check or m.o.

☐ Charge my

☐ Visa/BankAmericard

☐ Master Charge

Credit card number _____

Name _____

Address _____

City _____ State _____ Zip _____

When paying by credit card please also give credit card billing address _____

Allow 5 weeks for delivery of first copy. Outside U.S. please add \$2.00 per copy for postage and handling.



Cloning Humans: Hopes, Fears, And Myths

Justin Leiber

THE FOLLOWING beliefs about human cloning sometimes appear in the media:

1) A clone of me would be a perfect duplicate of me—it might be physically indistinguishable from me. This, of course suggests legal puzzles about identity and ownership, and James Bond style games ("When the President reappeared after that mysterious incident he no longer had the scratch he got on his arm yesterday—do you think . . .?").

2) At present there are no clones, and scientists do not now have the technique to produce such clones.

3) Once cloning techniques are improved, it will be possible to clone up a duplicate of oneself in a laboratory tank in order to provide "spare parts" that will pose no danger of rejection.

(Currently, the grave danger of rejection is much reduced by donation from a close relative, such as a brother or sister. The danger is reduced, ultimately, because such a relative will have similar genes. Your clone would have a genetic constitution *identical* to yours. Rejection couldn't occur. Your own parts make perfect replacements. Always available, too: your brother may give you a kidney, but forget it if you need a heart.)

4) Using cloning techniques, a mad scientist, or whatever, might grow a hundred thousand copies of himself in laboratory tanks and send them out to take over the world, somewhat in the manner of the legendary Cadmus who sowed dragon teeth that sprang from the earth as armed warriors.

All of these views are false. Here I

will try to show you what is wrong with these views. What is most interesting is that in showing what is wrong with these views we get some insight into human identity, human development, and the interplay between genetic endowment and surrounding environment, between "nature" and "nurture."

In calling all four views false, I am hedging a little about (2), so I will start with it. The hedging appears because there are four ways that biologists use the words "clone" and "cloning" and none of these is what the media seem to have in mind.

First off, a clone is the sexual offspring of a one-celled organism such as an amoeba. An amoeba contains a nucleus of genes sorted into chains of chromosomes. This is true of any cell for

that matter. Human body cells, for example, normally have nuclei which contain 23 pairs of chromosomes and some much larger number of genes. Our sexual cells contain half of each chromosome pair. When a human egg and sperm unite, one has a new full complement of 46 chromosomes which direct the growth of the individual and which will be found in each body cell of that individual (each of the non-sexual cells in your body contains identical and complete genetic directions for making you). An amoeba, however, reproduces by creating two nuclei, each containing the same full genetic complement, and then splitting into two cells.

Hence, ignoring mutations, an amoeba has exactly the same genetic constitution as each of its ancestors. Strictly speaking, when an amoeba splits into two genetically-identical versions of its parent cell, you cannot say which is the clone. They *both* are clones of the original, just as their parent cell was one of two clones of *its* parent cell. This is a point to remember if you are thinking of cloning yourself. More on this in a bit.

Second, it is natural that "cloning" has also come to mean the *artificial* asexual reproduction of genetically-identical body cells from multi-cellular organisms that reproduce sexually. So if I take a muscle cell from your body and induce it to create a copy of itself, that copy is a "clone." While we cannot do this very well in the laboratory yet, your body does this sort of cloning every day.

Third, again by extension, if you could get such a body cell to develop into a whole new multi-cellular organism, you might call this process "cloning" and the new organism a "clone." When scientists say that we have not yet cloned humans, this is often what they have in mind. Many multi-cellular organisms have been cloned in this or a closely related sense. Rabbits, for example. However, you cannot get a mature "clone" rabbit with mature and healthy organs or a functioning nervous system by putting a "cloned" rabbit egg in a tank of nutrients and waiting. No.

What you have to do is this. You put the "cloned" egg into a functioning rabbit uterus and you let it grow. Perhaps you could make a "nutrient tank" that would do what a rabbit uterus does all through gestation—maybe. And you might be able to go the same distance with a human clone. But one thing you cannot do in a "nutrient

tank" is to maintain conditions that will allow a newborn mammal to grow to full healthy maturity, or even any distance toward full healthy maturity. To grow the brain, sensory, motor, muscular, and organ systems of the rabbit newborn you have to let the baby rabbit do all the things normal rabbit babies do—you have to let the newborn "clone" co-ordinate and tune its sense and motor systems by bouncing around and looking, smelling, and hearing. So the problem of "raising up" a cloned rabbit egg (or human egg) is just the same as with a non-cloned, or naturally-produced, rabbit egg (or human egg).

There is a fourth way in which biologists use the word "clone." The word is used not only for a single instance of an asexually-produced duplicate of a single- or multi-cellular organism, but for a colony of such duplicates, so that a colony of clones is a "clone," not "clones." This use of the word "clone" for a colony of genetically-identical cells is apparently the oldest use of the word. Clone colonies—particularly of genetically-identical body cells scavenged from multi-cellular organisms—are central to genetic research because you can run them through all sorts of tests with the assurance that each time you are starting with an identical genetic structure. Human genetic research outside the laboratory has depended a great deal on the existence of identical (that is, genetically-identical) twins. The idea has been to compare identical and non-identical twins. The theory has been that factors for which we find a much closer correlation among identicals will be factors that are much influenced by genetic endowment—for example, the average difference in height about non-identical twins is three times greater than it is among identicals. But identicals are not common and research about them is confused, often prejudiced and anecdotal, and very restricted for moral—but above all, practical—reasons. Imagine what you could do with laboratory clones of human body cells!—it would be like having thousands of identical twins, with new generations to check experimentally every few hours rather than decades.

Let me give you two examples of the kind of research that cloning techniques have made possible.

In the early 1950s techniques were developed for inserting the genetic material from an amphibian body cell

into an amphibian egg whose genetic material has been removed (if you do this several times, using body cells from the same amphibian, you get a clone colony of genetically-identical animals). This research immediately gave answers to some old and central questions. Though scientists have long known that our body cells contain genetic material, it would seem extravagant of nature to design us so that each of our body cells contains a complete and still fully-operating set of instructions for building us, one just as complete and operable as that in the fertilized egg from which we grew. Nature turned out extravagant. If you insert genetic material from an intestinal cell of a frog into a genetically-empty frog egg and you let the cell develop normally, you will get a perfectly normal frog, one genetically-identical to the frog from which you got the intestinal cell. (Non-genetic cellular material seems to determine the stage of development. Thus our frog-cloned cell does not make intestines but rather carries on as a frog egg.)

A related result bears this out in the earliest stages of embryonic development. If you take genetic material from one stage and place it into a genetically-emptied cell from another stage, the cloned cells will act as if they were at the emptied cell's development stage, not that of the genetic material. This suggests something about the debate as to whether something is a result of genetic endowment or "the environment": what it suggests is that the environment—for example, the non-genetic cellular material—is calling a lot of the shots from the moment of conception.)

By the middle sixties we find scientists working with mouse-human hybrid body cells. Though attempts to cross sexual cells from different species are almost always failures, genetic material from different species can co-operate within body cells. After several generations of mouse-human hybrid cells, the number of human chromosomes declines. In one experiment, mouse cells that lacked genes for the production of an enzyme were hybridized with human chromosomes that could produce the enzyme. These hybrids lived for many generations in a medium that would have killed the original mouse cells. Finally, the number of human chromosomes became so few that it was possible to determine which human chromosome actually managed the production of thymidine

kinase—the mouse body cells died when this chromosome disappeared. An interesting case of interspecies dependence!

That human genetics needs such techniques to get anywhere is suggested by the fact that it was not until 1956 that it was discovered that humans have 46 chromosomes rather than the 48 chromosomes that had been reported for decades. What genes occupy what chromosomes is still almost a total mystery.

If you think about it, it is not hedging all that much to say that human identical twins are clones. Identical twins are produced when a fertilized egg reproduces two identical versions of itself (roughly, in the asexual manner of any amoeba). These two genetically-identical cells then go on to become two genetically-identical individuals. So we already have human clones. Identical twins are clones by nature. If you tried to do it artificially, matters would proceed in much the same way after the initial cellular divisions.

Notice that we now have a good basis for denying that my clone would be a perfect duplicate of me. If I had an identical twin of the natural sort it would not be a perfect duplicate of me. Identical twins are identical in genetic constitution but they differ in all sorts of ways (long before birth, too), even if they have a very similar environment. If you wanted a perfect duplicate you would have to start with a perfect copy of the original fertilized egg, grow it in a perfect simulation of the original uterine environment, and then have it grow toward maturity in a duplicate of your home and school physical and psychological environment.

The perfect duplicate of you will have to go through just the sort of experiences, frustrations, and decisions, diseases, poisons, and nutrients, that you went through. And, of course, this duplicate would have the human rights and sense of personal identity that you have. (If you question whether or not a clone of you would have the legal standing and independent identity of any other human being, reflect on the case of identical twins. Though usually identicals are born one after the other, no one has ever denied that the second-born identical has the full human and legal status of a second-born fraternal twin. Your clone would be just as human as your identical twin if you had one.)

Natural identical twins differ quite a bit even if they are raised in what we

would consider much the same environment. But you are not going to get anything like that sort of similarity—in fact, you are not going to get anything—if you were to raise your cloned identical in a "nutrient tank."

The trouble is that a human—even more than a rabbit—requires plenty of complicated interaction with the proper sort of environment to reach healthy maturity. Let's start by seeing the problems we would have in producing a fully functional human. Then we'll work down to the organ systems. The main theme is simply that it takes a long time and complicated (and expensive) interactions with an environment to produce a human organism or its substantial parts. (The chemical elements in a human being, or any large mammal, cost about \$25. Reflect on what the chemicals are worth when arranged into a Ron Carew, a Thomas Edison—or a champion race horse, for that matter. Let's suppose you want to build a human being from the elements up. How to do it? Well, make an earth-sized planet and set it in rotation around a suitable sun, having stocked the planet with a good mix of chemical elements. Wait a couple billion years while it's growing. You got a better way?)

Consider your visual system. Suppose you want to grow some replacement eyes in our nutrient tank. What will happen if we try to grow a set of eyes without allowing them to be used in the normal manner? We have some idea from the case of babies that happen to be born with cataracts that prevent the use of otherwise normal eyes. Whether such babies will see is determined by whether the cataracts are removed within the first six months of life. If the operation is performed within that period, the child will develop normal eyesight—learning to co-ordinate and "fine tune" vision with other senses and motor skills in the manner of an ordinary infant. But if the operation is delayed until the age of one or two, the child will never have anything like normal eyesight (if cataracts appear after the child "grows" a normal visual system, normal vision will be regained no matter how long you wait before removing cataracts). It seems as if our visual system needs to be exercised and tuned at a particular point in its final growth stages.

From work with various animals we know that the nervous connections and chemical sensitivities of the eye are strongly influenced by kinds of visual

experience or lack of them. A kitten "grown" in an environment with lots of horizontal lines "grows" eyes that will forever differ in chemical and neurological wiring from the eyes of a cat that "grows" its sensory-motor system in an environment with lots of verticals. Similar considerations apply to the other senses: they have a development and growth schedule, and they require all sorts of tuning and co-ordination. The human clone in the nutrient tank would not be able to see.

All this would apply even more dramatically to the motor-muscular system. Our muscular system, indeed our respiratory and circulatory systems, require plenty of suitable exercise to grow up in the proper way or just to maintain themselves. Obviously we are not going to get suitable muscular-motor development or sensory growth unless we get our human clone out of the tank, exercising sensory, motor, and muscular capacities. But everything we know about biology suggests that this will take as much time as normal human development and that this will have to mean the development of a human personality and mind.

When I say "everything we know about biology," I have in mind two points: 1) If you want to produce an organic chemical, a genetic or non-genetic cell constituent, and still more a cell or cellular system, you have to get nature to grow it for you. Nature has been doing these things for millions of years and has worked out the most rapid and reliable ways—and in almost all cases the only ways. 2) In most cases nature does what it does as rapidly as possible; nature does have ways of speeding up some development, but not by much—and at considerable cost.

For an example of the last point, consider the swarming of the locust. In ordinary times the locust takes over a year to reach an adolescent stage at which it remains for life. In swarming times, when the environment seems to allow the sudden production of huge numbers, hormones speed maturity at twice the rate. The swarmer goes through the normal "adolescent" stage and on to a more mobile adult—but the adult is smaller and less filled-out than the normal non-swarmer. Similarly, certain hormone disorders in mammals, or humans for that matter, can speed certain aspects of development. But the speed-up never amounts to more than a small percentage of normal developmental time and there is almost always

Cloning Human

some cost, some deviation from normal maturity. So any conceivable attempt to speed the development of a cloned human beyond normal human growth rates would only be successful to a small degree and at increasing cost. The mad scientist who hoped to emulate Cadmus by cloning warriors would have to maintain a nursery and training community for more than a decade—considering costs, it would be simpler for him to hire a lot of mercenaries.

Let us suppose that you are a Russian agent and that you have secretly managed to kidnap one of Jimmy Carter's body cells (watch your blood sample!). The Russian scientists insert its genetic constituents into an emptied human egg. How long will we have to wait before we can switch? Forty-five years sounds like a reasonable minimum. But let's suppose we have a lot of luck with premature aging hormones—from all we know it seems impossible that much time could be cut from the first ten years of growth without obvious physical effects. So you might get a duplicate of President Carter some twenty years after he left the White House.

Eat your heart out, Igor Bondskii!

Okay, let's hit the bottom line. We can't produce a workable sensory-motor-muscle system for "spare parts" without creating a human mind and personality (and without taking the natural number of years). But what about parts that don't seem to require this sort of development? How about kidneys or corneas? Couldn't you grow them in a tank (or a vegetably-functioning human)? There seems no conceivable way to produce such a kidney or cornea other than through the normal fetal development of a cloned (or uncloned) egg. Maybe you could keep the fetus going long enough (two vegetable years? three?) to be able to scavenge a kidney or a cornea for transplant with low rejection risk. But why bother with the cloning part? Natural offspring will lower the rejection rate very substantially. So the only spare parts we are likely to be able to produce are more or less available now—just have a baby of your own. It is satisfying to realize that there are no takers that I know of. When you ride with nature, you ride nature's way and you pay nature's fare.

You will do best to befriend your family and to encourage everyone to fill out organ donor cards. So few people fill out these cards that kidney patients are lucky to get them from Russia. In a class I taught on medical ethics, I was unable to convince a single student to sign a donor card for corneas and kidneys, much less anything else. Some states provide a form with your driver's license. You can write: Kidney Foundation of New York, 432 Park Ave. South, New York, NY 10016 for a card. Spare parts.

—G—

Red World (continued from page 32)

earth ship mired itself into a tar deposit, and had to get local help to pull out after the local temperature gets back down to normal and the vessel finds itself imbedded in a block of glass. Go to it, friends. Maybe Seacon will offer a prize for the story or painting which comes closest to the pictures which Pioneer XI takes about the time of that convention!

BIBLIOGRAPHY FOR RED WORLD II

This is far from complete—a lot of work has been done on Titan recently. The following items are reasonably up-to-date, though, and cover most of the key points in the article.

Khare, B.N., and Carl Sagan, "Red Clouds in Reducing Atmospheres," *Astrospace* 20 (1973), 311-321.

Lewis, John S., "Satellites of the Outer Planets: Their Physical and Chemical Nature," *Astrospace* 15 (1971), 174-185.

Podolak, M., and R.E. Garstner, "Asel Dust on Saturn and Titan," *Astrospace* 30 (1977), 479-492.

Pollack, James B., "Greenhouse Models of the Atmosphere of Titan," *Astrospace* 19 (1973), 43-58.

Pollack, Gorenman, Moore, and Geraschke, "The Formation of Saturn's Satellites and Rings, as Influenced by Saturn's Contraction History," *Astrospace* 20 (1976), 35-48.

Sagan, Carl, "The Greenhouse of Titan," *Astrospace* 18 (1973), 649-656.

Sorbel, Gervil F., "The Photochemistry of Hydrocarbons in the Atmosphere of Titan," *Astrospace* 21 (1974), 466-470.

Traffon, L., "On the Possible Detection of H₂ in Titan's Atmosphere," *Astrophysical Journal* 175 (1972), 285-293.

— "The Bulk Composition of Titan's Atmosphere," *ibid.*, 295-306.

Vevecka, J., "Polarimetric Evidence for an Optically Thick Atmosphere?" *Astrospace* 18 (1973), 657-660.

Zellner, Ben, "The Polarization of Titan," *Astrospace* 18 (1973), 661-664.

Obvious moral: subscribe to, or otherwise keep up with, *Astrospace*.

A book which has much of the foregoing in somewhat more terse form is *Chemical Evolution of the Giant Planets* edited by Cyril Ponnamperuma, Academic Press, 1976. Chapter 3 and Section IV of Chapter 4 deal with Titan, but don't confine yourself to these. The book is required reading for a hard-science space-opera lover.

Another summary which should be even better, though I haven't gotten hold of a copy yet, is *The Atmosphere of Titan*, NASA SP-340 (presumably Government Printing Office).

—G—

Cloning, as the production of genetically-identical body cells, will continue as the central avenue for genetic research. But if you are after spare parts,

Cloning/Red World

in 1987



Pioneer X will pass Pluto's orbit and leave the solar system. In case the capsule is intercepted by extraterrestrial beings, there is a plaque carrying an ingeniously designed coded message indicating its origin. The design has been silk screened on fine quality "T" shirts. The plaque is gold on grey shirt. Sizes XS, S, M, L, XL please specify. Also available on belt buckle or brass on plexiglass plaque.

T-shirt	\$ 6.50
Belt Buckle	\$14.92
Buckle with antique brown belt	\$21.52
Brass & Plexiglass Plaque	\$24.52

New Jersey residents add 5% sales tax

G&G
enterprises

PO Box D, Dept. G
Alpine, N.J. 08865

Profit From Pleasure... WRITING!

Perhaps you can write... blessed with a flair for words, an instinct for the dramatic and a fine story sense. Maybe you do have the potential to make people laugh, cry, love, hate, yearn, sympathize and THINK. But you'll never harness your natural powers until you prove you have them. Find out if you have the potential as a writer.

FREE APTITUDE TEST!

Take the test by mail without obligation. Let the Writers Institute editors analyze your basic talents. There is no obligation.

The word-hungry world of communications (literature, broadcasting, theatre, newspapers, etc.) offers qualified writers ample income opportunities. More than 19,000 periodicals are published regularly in the U.S. alone. Fewer than 15% of their authors are "big-name" writers. So you have every reason to give yourself a fair chance. Send for our FREE TEST, then decide about your future as a writer. Write to:

WRITERS INSTITUTE Dept. 27-01-9

Division Newspaper Institute of America
100 Mamaronck Ave. Mamaronck, NY 10543

© Licensed by the New York State Education Dept.
© Accredited Member of National Home Study Council

A GAMMA-HOLOGRAM OF YOUR PERSONALITY, IMPRINTED ON THE VIRUS YOU'LL SENSE THE HOST'S MIND BENEATH YOUR OWN, BUT YOU WILL HAVE CONTROL OVER HIS EVERY MOTION UNTIL, OF COURSE



WE PREFER THE TERM "DESTABILIZE"

YOU WOULD.



ETHERISED UPON A TABLE LIKE THE EVENING SPREAD OUT AGAINST THE SKY JUSTIN AWAKES HE STRUGGLES TO CONTROL HIS OWN BODY—BUT AT WHITFIELD, VERY WEALTHY, VERY DEAD, RULES

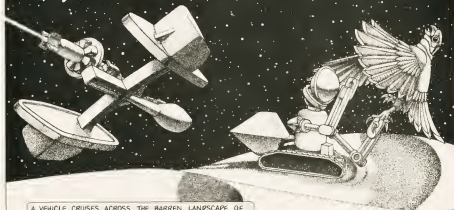
YOU WOULD



WHO CAN TELL US WITH ANY DEGREE OF CERTAINTY WHETHER THE DRAMA WE ENACT IS COMEDY OR TRAGEDY? DOES AN UNSEEN DIRECTOR STAND BEHIND THE SCENES—OR HAS HE LEFT THE THEATER? IS JUSTIN CASE, 23, MALADJUSTED ASSOCIATE CITIZEN OF AN OVERCROWDED EARTH, THE HERO OF HIS PERSONAL PLAY—OR THE FOOL? WE KNOW THAT LIFE AS AN IMPENTURED ASTEROID MINER OFFERED A GLIMMER OF A HAPPY OUTCOME TO JUSTIN—UNTIL THE DAY HIS GOPHER CRASHED ON AN AIRLESS PLANETOID, UNTIL HE DISCOVERED AND IN PESPURATION ACTIVATED THE ALIEN PEVICES THAT HAVE TAKEN HIM.

CROSSWHEN

by John Kessel and Terry Lee



A VEHICLE CRUISES ACROSS THE BARREN LANDSCAPE OF LEDA. AT THE CONTROLS, A MIRACLE OF MODERN SCIENCE: A GHOST AND SOUL OF JUSTIN CASE, THE MIND AND WILL OF AT WHITFIELD—A DEAD MAN.

BETRAYED BY MARK DAWN, JUSTIN HAS BEEN SOLD AS A HOST BODY TO CONSOLIDATED LIFE EXTENSIONS. THE PERSONALITY OF THE DYING, POISONED WHITFIELD HAS TAKEN CONTROL OF HIS BODY. JUSTIN CAN ONLY WATCH HELPLESSLY AS WHITFIELD, IN THE MONTH REMAINING TO HIM, BEFORE HIS PERSONALTY FAPES AND HE DIES FOR GOOD, SEARCHES FOR THE WOMAN WHO KILLED HIM.



JUSTIN'S PERIOPIC ATTEMPTS TO REGAIN CONTROL ARE INSTANTLY CHECKED BY WHITFIELD'S IRON WILL.



THE CAPTIVE KNOWS ONLY THAT HIS CONTROLLER IS INSANELY DRIVEN. HE CAN SENSE THE GREAT HATE AT THE HEART OF WHITFIELD AND PERHAPS SOMETHING OF THE ACHING LOSS THAT LIES BENEATH IT.



SELENA NIGHTSHADE. WHY DID SHE LEAVE? WHY DID SHE KILL HIM? THEIR AFFAIR HAD BEEN HOT AND DESTRUCTIVE AS SOME SOLAR FLARE AND WHITFIELD HAD NOT BEEN READY FOR ITS END.



NOW THERE IS ONLY THE HUNT. THE SANSJOY BABY FARM HAS NOT SEEN HER.

NOSIR



NOR HAS CAPT RALYLE OF THE SPACE MARINES.

BUZZ OFF, CIVILIAN.



NOR HAS SYBEL KELVIN OF LEBREAN, ROBOT AND MECHANICAL MEN.

I'M SORRY, YOUNG MAN.

IT STARTED WHEN I WAS A COG.



NOR GILSTAR OF THE DESERT SANDMEN.

NO WOMEN HERE, OUTWORLDER.



A MONTH HAS COME AND GONE, AND WHITFIELD'S TIME RUN WITH IT. AND THEN, AT EXCAVATIONS OF ONE OF LEBIA'S DESERTED ALIEN CITIES.

YES, I KNOW HER, BUT SHE DIDN'T CALL HERSELF SELENA NIGHTSHADE.

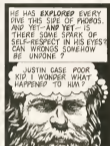
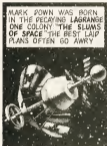


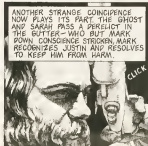
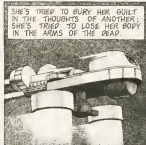
A MONTH HAS COME AND GONE. GONE WITH IT IS 500 GREENS 'BLOOD MONEY'—AND MARK'S PEACE OF MIND.

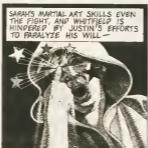


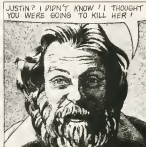
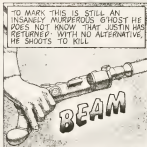
SET IT UP AGAIN, TENDER.













PENNY ON A SKYHORSE

Michael Coney

THE HEAVY MARCH SWELL lifted and dropped the boat sickeningly. It was raining but there was a faint brightening of the sky to the west. The ocean was deserted apart from a single large hydrofoil motor yacht which cut through the grey morning about half a mile away.

The motion of the sea worsened as I entered Wasp Narrows, a neck of water notorious for its tidal rip. Down the coast I could see the cottage of Daniel Westaway, who fishes these waters with the aid of a team of dolphins. Beyond the lagoon, the wooded hillside rose to the rooftops of Miranda Marjoribanks's mock-tudor residence. Securing the tiller, I went below to brew myself coffee.

As I filled the kettle, lit the propane jets and threw some powder into a pot, I kept an eye on the scene through the portholes. The boat remained on course, ploughing through the Narrows in the direction of the Fulcrum post which showed as a dark blob in the widening expanse-ahead.

Apart from my stomach, everything seemed under control, which lent a special quality of shock to the event which followed.

Larry Brown

The boat stopped dead.

It stopped with a heavy, bone-jarring crash, half a mile from land with five fathoms of water beneath its keel. It stopped so suddenly that I was flung into the dark fo'c'sle, smashing my skull against the bulkhead so that my brain blazed with quick light.

Then the engine screamed. There was another crash, although less severe, the thump of the diesel rose to a wall of protest and the boat shuddered in sympathy. Guessing the propeller had sheared off, I cut the engine and began to drag the inflatable liferaft from its locker—although what protection I expected from that rubberised fabric, I don't know.

I jerked the valve and the raft roared, swelling and crackling as the compressed air flooded its internal cavities. Soon I had to leave the cockpit and crawl onto the cabin roof as the monstrous red thing bloated itself into a shapeless mass and I realised that half of it had inflated inside the locker. So there was no way I was going to be able to use that raft, except by deflating, then re-inflating. I glanced at the water around me.

The trough of a wave revealed a vast shape, humpbacked, barnacle-encrusted, and mottled, then it was gone in a swirl of foam. At the next wave it had disappeared. I sat on the cabin roof with nothing to do except watch the tossing water and wait for the next impact.

It never came. I drifted on, and after a while the distant hydrofoil cruiser changed direction and raced towards me, flinging twin feathers of spray from its still legs.

"Really, Joe, if you will insist on drinking at this hour in the morning, what can you expect?"

We stood in the cockpit of Carioca Jones's yacht, *Flamboyant*, cruising up the Strait towards Skipper's Marina. My boat rode behind on a short tow, the inflated raft bulging above the stern like a giant red breast.

"You were extremely lucky I was about," the ex-JV star said.

"I ran into some sort of whale, that's all. I saw it—it was a monster. A grey whale, I'd say, on its way north."

"Most unlikely. However..." She glanced through the open hatch into the cabin below. "Penelope!" she called, in a voice of sickly sweetness. "Come and meet our shipwrecked mariner, darling."

The face that appeared above the companionway was that of a small girl. I judged her to be around ten years old. Her features were set in lines of discontent.

"What do you want?" she asked.

"Penelope, I'd like you to meet a very dear friend of mine, Mr. Joe Sagar. Joe, this is Penelope Matravets."

"Hi, there," I said. The child grunted.

"Can I go back and read my book now?" she asked.

"Well really, Penelope. Of course, it's entirely up to you, darling—but don't you find the company of friends and the beautiful ocean more interesting than some stuffy old book?"

"The ocean stinks." So saying, Penelope turned and climbed back down into the cabin. I saw her slump onto a berth and pick up a paperback.

Carioca glanced at me significantly. She lowered her voice—an accomplishment of which I'd never thought her capable. "That child is driving me up the wall, Joe," she whispered. "My God, why I agreed to take her I'll never know. She only arrived last week, and she's bored already, and she's supposed to be staying with me for another month.

My dear, I'll go literally insane."

I made sympathetic noises; after all, she had rescued me and saved me from several hours aimless drifting.

After a while Carioca handed the wheel over to me and went below. I steered a course for Roberts Point, while the rain drifted inland and a watery sun appeared. I heard Carioca trying to persuade her small house guest to come out on deck, but without apparent success. Ice tinkled in glasses and she reappeared.

"Here you are, Joe darling." She handed me a scotch and ginger.

I think we both saw it at the same time. The rain still hung over the low-lying Peninsula, but the whitecaps of the ocean were brilliant with new sun. Behind us, my boat rode steadily.

There was something strange in the sky.

At first, I thought it was a sling-glider—although, so far as I knew, nobody'd had the courage to brave the cold waters and blustery winds this year. It climbed out to sea, rising from the coast about two kilometers astern.

The sun caught it, and it was white—brilliant white. I heard Carioca catch her breath as we saw huge wings steadily beating. The creature rose higher, banked and came swooping down out of the pale sun like an albatross, but bigger than any bird I'd ever seen.

"What the hell is it?" I whispered.

I heard an exclamation of delight from beside me. Penelope was there, watching the huge creature wide-eyed, her lips parted.

The thing—half-bird, half-beast—hovered for a moment nearby. The great wings backdropped, rustling hugely, raising little slivers of spray from the cold ocean surface. It hung there, fifty yards away, vast and strangely beautiful, all feathered in white, watching us with small sad eyes in a long head. Four legs hung from a body which was not in the least birdlike; one clawed foot trailed in the water.

Then the thing snorted, tossed its head, and with a great sweep of wings gained height and headed back for land. I felt the wind of it as it passed. I was awed; there was nothing I could say. I didn't want anyone to speak for a while.

"I want one of those things," stated Penelope.

LATER THAT DAY at Skipper's Marina, where I had taken the boat for repairs, I went to the clubhouse for drinks.

Talk in the clubhouse dwelt exclusively on skyhorses. Apparently it was one of these beasts which we had seen that morning.

"Miranda Marjoribanks has imported a pair," Doug Marshall told me. "They cost a goddamned fortune, but she reckons she's going to breed them."

"Most beautiful creatures," said Bryce Alcester, the club secretary. "It is a sad commentary on us humans, who have wiped out virtually every land creature on our planet and are now reduced to making pets of fish, that we should be forced to look to other worlds for the beauty of nature." Bryce Alcester is a good secretary, if you can overlook his tendency to talk like an ecological textbook.

"But it took good old Earth know-how to get out there and bring them back!" boomed Ramsbottom.

Later in the afternoon Daniel Westaway came in, and I pumped the marine biologist for information on what I'd hit in the Narrows.

"It's the Hog's Back," he said.

"The Hog's Back is much further up the Strait, north of the

PENNY ON A SKYHORSE

Fulcrum," I objected.

"It's moved. It moves every year, hell, two miles or so. A few years back it was lying off the mainland shore, off Sentry Down. They called it the Creeping Reef." He hesitated. "I'm publishing a paper on it, next month."

He wouldn't say much more, and talk returned to Miranda Majoribanks, and the beautiful skyhorses.

I had my first close look at the skyhorse two days later. On the pretext of begging a roll of surplus chicken wire for my slithe pens, I visited Pacific Kennels.

I found Miranda Majoribanks in a despondent mood.

"Really, Mr. Sagar, it's most depressing. The wretched creatures are little better than vegetables."

She'd had a small enclosure built some distance from the large fish pen where strange black shapes lay about in the chill sunlight. The skyhorses stood side by side as though drawing morose comfort from each other's company. They gazed at us with lacklustre eyes, thin wisps of vapour drifting from their nostrils.

Seen close to, their resemblance to terrestrial horses was not so great. True, the head was equine, although elongated and angular, giving a tortured impression similar to the animal in Picasso's *Guernica*. The body, however, was slender, almost sinuous, and covered in white down. The wings were huge and feathered, like classical angel's wings, although now they drooped, tips dark from dragging on the ground.

Were it not for the feathers, the beasts would have looked more like mythical dragons than anything else I can call to mind. They watched me without fear, without interest. Their legs were strong and short, and terminated in claws like the talons of some gigantic bird of prey.

"I saw one flying, a couple of days back," I said.

"And it's probably the only flight he'll ever make. I may well sue the supplier—although I have little chance of recovering my investment, I'm afraid. The export agency operates out of Vega. I've often felt that an agent's honesty is in inverse proportion to the distance between him and his client. And they assured me that I was getting first-rate breeding stock. Breeding stock!" She laughed bitterly. "I ask you. Look at them, Mr. Sagar."

I had to agree with her. Anything less virile than the skyhorses would be hard to picture. They were actually leaning against each other. I noticed one skyhorse wore a bandage around the right foreleg.

She sniffed. "Simply a further example of the stupidity of these creatures. Carioca Jones was here, with her sawfish Cholmondeley—and heaven knows, I have little time for Carioca; but on this occasion she was in no way to blame. And Cholmondeley is a dear, really, I picked him for Carioca myself. But we all know Cholmondeley is highly-strung. He took one look at the skyhorses and panicked, and went into one of his thrashing fits. The first thing we knew, he'd opened up the most awful cut on Chagford's leg."

I often wonder why it is that I seem to miss out on the best things in life. The pandemonium and recriminations which lay behind Miss Majoribanks's casual description would have been worth seeing. "Chagford's the male animal, huh?" I said.

"Quite. I call the female Clara Belle—for what it's worth. Anyway, there was worse to follow. A couple of my land sharks were out, and they smelled the blood, and they went simply *hersek*—but I'm never without my gun, when

Michael Coney

exercising sharks. I was obliged to shoot the poor creatures down."

I regarded the passive skyhorses. "I'd have thought they'd have taken off at the first sign of danger."

"That's just the point, Mr. Sagar. They don't recognise danger. My God, they don't recognise anything. I really can't think how they survived, on their home planet. Shall I tell you what I think, though? I think I've been sent doctored deer. If I breed them here, you see, it cuts down on the orders which the supplier will receive from Earth. So it's not in his interest to send me sound beasts." She lowered her voice, assumed a confidential air, and said, "It's my theory, Mr. Sagar, that these animals have been lobotomised. They don't know fear. They don't know joy, or even hunger. And they most certainly don't know sex. I've been swindled, utterly and completely, by a heartless organisation which has preyed on my love for dumb creatures."

"So what are you going to do? Find some mug to unload them onto?"

"I shall spare no effort to find them a good home," she said with dignity.

IT WAS A WEEK LATER when the mailing hovered overhead and dropped the delivery neatly into my coded reception basket—I think I even waved cheerfully to the small machine. It climbed away, computing its next destination. There was one letter; I slit it open.

It was on Carioca Jones's scented paper. The letter was short and to the point. She was requesting payment of salvage fees in connection with the incident in Wasp Narrows. The figure she quoted was astronomical. She remained mine faithfully.

I jumped into my hovercar and headed for her place.

"Joe, darling! How nice to see you."

She advanced across her huge open-plan living room, arms outstretched as though greeting a horde of fans. She'd kept me waiting forty minutes but I had to make allowances; it was only 10:30 a.m.

"Listen, what the hell is the meaning of this bill?"

"Oh, Joe—must we discuss sordid business matters on a morning like this? Put it back in your pocket, there's a good boy. Quite frankly," she smiled brilliantly, hard black eyes watchful, "I prefer to keep business and pleasure quite separate. Much better that way, don't you agree? So sit down and have a cup of coffee and tell me what you've been doing this week, and we'll leave the bill to our attorneys. Oh, and I have a lovely surprise for you. You'll never guess what. Go on, try, Joe. Guess."

"For Christ's sake."

"Isn't our Joey a crabby old thing this morning? Perhaps our Joey forgets all the lovely slitheskin dresses his dear friend Carioca has bought from him, and all the other profitable business she's put his way—without ever asking for so much as a cash discount. So cheer up, Joe, drink your coffee and then I'll show you the lovely surprise."

It was like a scene straight out of Greek mythology. In the middle of the meadow stood a gazebo of white stone, its classical roof supported by elegant columns. The floor was of multicoloured mosaic, and broad steps led down to the grass on four sides. From where we stood I could see the inside of the roof, which was decorated with a frieze of dancing figures.

And around the grass beside the structure ran Penelope,

GAILEO 51

playing with two snorting, prancing skyhorses.

"Are those Miranda Marjoribanks's animals?"

"My dear, the creatures are mine! Aren't they just divine? And don't they set the gazebo off beautifully?"

I watched Penelope. The skyhorses were standing still now, and she stood beside one with her arms around its neck, talking into its attentive ear. "Who is her father, anyway?" I asked. I was curious to know what kind of a parent could commit his daughter to the care of Carioca Jones for any period in excess of five minutes.

"A very dear old friend in the movie business," she replied in sentimental tones, "who is at present on location on the most inhospitable planet. He was so grateful when I offered to take the child off his hands for a few weeks."

I got the picture. No wonder Carioca was going to unusual lengths to please Penelope and make her stay a memorable one. There was some sort of a contract in the offing. It was no secret on the Peninsula that Carioca's retirement was an enforced one—this was not the first time she'd tried, deviously, to get back into the 3V alcoves. No doubt she was hoping that the father, returning to find Penelope happy and well cared-for, would be overcome with gratitude and offer her a lead in his next space-opera.

At that moment Carioca uttered a little cry of alarm.

Penelope was sitting astride one of the skyhorses. She leaned forward, stroking its head and talking to it. The creature's huge wings were spread, the tips brushing the ground, and in the crisis of the moment I was still thinking that everything would be fine, that there was no way that a skyhorse could leave the ground—the wingspan was too great—

"Stop her, Joe!" screamed Carioca Jones.

There was nothing we could do. The skyhorse was already pounding away across the meadow with huge, bouncing strides, wings held high. Penelope hung on, flattened along the animal's back. The short, muscular legs flung the skyhorse further into the air with each step, while the dew sprayed from the wet grass like the wake of a waterskier. Then, suddenly, the wings swept downwards and the creature rocketed into the sky, disappearing almost immediately into a bank of mist which hung low over the sea.

"My God, Joe, she'll be killed! What the hell are you standing there for? Call the police immediately, and the coastguard! Oh, Christ." She sank down onto the stone steps of the gazebo, a dramatic figure of despair. "It's too late. Let's not fool ourselves. She's dead." She looked up at me, tears cutting through the cosmetics, "I shall personally sue that unspeakable Marjoribanks woman for every penny she owns."

The skyhorse came swooping down out of the mist and passed close overhead, so that we could hear the hissing beat of its huge wings and the delighted yelling of Penelope.

Carioca leaped to her feet and gesticulated wildly, screeching. The airborne couple banked and vanished again.

"I think she's safe enough," I said.

But Carioca could see her chances of a 3V comeback fading with each perilous minute. As the skyhorse made its next pass overhead she went into another frantic performance, and this time her fear and urgency did not go unrecognized. The skyhorse turned low and came in to land like an old-fashioned jet plane. Its neck was outstretched, its short, feathery tail streamed horizontally behind. Its wings were spread to the fullest extent, pinions downturned. It seemed to be coming in fast, too fast; I could picture it cartwheeling the moment it hit

the ground, crushing Penelope beneath that great bulk.

But just as the impact seemed inevitable the skyhorse lifted its head, stalling with wings stiff. The short legs began a rapid running motion, becoming a blur of movement before they even touched the ground. Then the dew sprayed and the animal was racing across the meadow towards us, slowing, folding wings, trotting to a halt beside its companion. With total unconcern it dropped its head and began to crop grass, while Penelope slid from her seat and ran up the gazebo steps.

"Isn't he marvellous, Carioca?"

"Well, really, I don't think—"

"Hello, Mr. Sagar. What do you think of my skyhorses? Do you want to try, huh? Carioca won't go near them. I think she's scared of being bitten. But you're used to animals; I can tell they like you."

"What's happened to your face, Carioca? You look awful."

"Now just you listen to me, young woman." The ex-3V star's face was set with determination. "Under no circumstances will you set foot upon the back of that brute again, you hear me? Even if you have no thought for your own safety, you might at least have some consideration for my position, My God." She stared at the skyhorses with loathing. "Any repetition of that performance and I shall have no compunction in selling them back to Miranda Marjoribanks," she continued, as Penelope turned her back and rejoined the skyhorses, "at a considerable profit. I should hope, since they have now regained their penchant for flying, it seems."

We watched Penelope talking to the male animal; the child shot Carioca a look half reproachful, half mutinous as the skyhorse lifted its head and nuzzled her.

"Uh, that's not all they've regained," I remarked.

Carioca glanced at me, uncomprehending, then back at the skyhorses. Her eyes widened.

A casual observer's first impression would have been of the great size of the act, the considerable acreage required by the skyhorses when mating. The wings of both creatures were extended horizontally to their fullest extent, and they trembled like humming-birds' wings. Penelope had withdrawn a short distance and was watching, absorbed, as the creatures circled each other like wrestlers seeking an opening.

"Penelope! Come here this instant!"

The child, not wishing to miss the fun, moved away. For a while the scene resembled a weird ballet, the skyhorses gyrating clockwise, while Penelope and Carioca Jones circled them, but in the opposite direction. Then the skyhorses paused, and the male's wing passed over his companion's body. The female crouched. The male moved in, reared up. Tumid flesh swung. Carioca despaired of catching Penelope and went straight to the heart of the matter, flinging herself at the male skyhorse and pounding his haunch with her fists.

"Filthy beast! Filthy beast!"

With her knowledge of the world and its ways, she ought to have known better than to try to deter a member of the male sex at this late stage.

On the next Saturday, I attended an import auction at SENTRY DOWN. Almost the first person I saw was Carioca Jones. She was accompanied by a sulky-looking Penelope; they stood looking at a cage in which cavorted three unlikely beasts.

I heard Penelope say, "I don't like them. They smell funny."

Penny was fretful and I gathered that this was not due to some trauma following the sprightly sex act, but was simply because Carioca had taken the skyhorses away from her.

"Honestly, Joe, what else could I do? Those wretched creatures were positively *perverted*. They never *stopped*. What you saw was just the beginning. Heaven knows what ideas have been planted in that dear child's head. So I had to return them to Miranda, and ever since then Penelope has been *incosolable*."

At that moment I saw Miranda Marjoribanks bearing down like a man-of-war dressed in heavy tweed. "Well," said the proprietor of Pacific Kennels loudly.

"I really don't know what you mean."

"I refer to the crippling *guilt* which you must be feeling, woman."

"Pray explain yourself, Miranda."

"Did you or did you not inform me that the skyhorses had been in the care of a well-known and expensive veterinarian, and were now in excellent physical fettle? And I was good enough to buy them from you on that basis, do you deny that?"

"Perhaps you'll come to the point, Miranda. Dear Penelope here becomes *hysterical* at the very mention of those depraved brutes and I have no wish to discuss the matter in public. If you're dissatisfied—"

Maranda Marjoribanks uttered a bark of cold laughter. "Dissatisfied? My god, woman. I intend to sue you for every possession you have, and that includes future royalties. Since you foisted the animals off on me they have not so much as flapped a wing. And as for mating," she barked again and Carioca glanced around nervously. "I can assure you that nobody, but *nobody* knows more about inducing recalcitrant sexual partners than I—and I've tried *everything*. No. Either you are the most despicable confidence trickster, or it's so long since you've indulged in sex that you've forgotten what it looks like!"

WHEN MY BOAT WAS REPAIRED, I collected it and visited Daniel Westaway at his solitary cottage by the water's edge.

Westaway had company.

"Lines Brewster," Westaway said. "Lines is an old exobiologist buddy of mine. He just dropped by. As a matter of fact, he's on the Peninsula at Miranda Marjoribanks's invitation. She has some problem with the skyhorses," he explained.

"You know this Majoribanks woman?" the zoologist asked me.

I described the situation to date, culminating in the dispute at the spaceport auction. I was about to enlarge upon the skyhorses' lack of sexual activity when Brewster interrupted me.

"No need to say any more, Sagar. I think I have a pretty good idea what the problem is. Hell, if people learned a bit more about extraterrestrial biology before importing pets, my job would be one hell of a lot easier."

Brewster played his hand very close. Watched by Miranda Marjoribanks and me, he examined first one skyhorse, then the other, running his hands over their legs, lifting their wings, peering into their mouths. I had to give him his due—he was thorough, and the skyhorses submitted to his probing passively.

"What's this cut?" he asked at one point.

"A sawfish slashed at him. The wretched creatures have no sense of self-preservation whatever."

"Uh-huh. Uh-huh." Brewster held a stethoscope to Chagford's downy chest.

Eventually he straightened up. "Miss Marjoribanks. These animals will never produce young, and they will never fly. They are prey to every predator on the Peninsula—every disease, even."

"Utter nonsense!" Miss Marjoribanks reddened. "They are receiving the best of care."

"Amateur care can sometimes be cruelty, Miss Marjoribanks."

"Amateur! I'll have you know I'm a qualified veterinarian, my man! And what's more—"

"Correction, Miss Marjoribanks." Brewster held up his hand like a traffic cop as Miranda Marjoribanks was about to enumerate her qualifications. "You are a terrestrial veterinarian. Your knowledge of alien life forms is scant. The skyhorses are an alien life-form. Therefore you are unqualified to have care of them."

"Explain yourself, Mr. Brewster." Her expression was stony.

Brewster stuffed his instruments back into his bag with an air of finality. "It is earthbound thinking, Miss Marjoribanks, to assume that all creatures go around in pairs. Many do. Humans tend to. Even your sharks over there"—he nodded towards the enclosure where the land fish basked in the thin sunlight—"need two sexes to produce young."

"My dear Mr. Brewster—I need no lesson in elementary biology. I am quite capable of detecting the difference between those two skyhorses."

"I'm sure you are. But it takes *three* skyhorses for sex, Miss Marjoribanks. Three, or five, or seven—in the wild, the average herd will consist of thirteen animals. Six males and six females—they are virtually monogamous—and one neuter, whom we call the prince."

"The what?"

"The prince is a superior creature in every way. He is bigger and stronger than the males and females, and his senses are more acute. He dominates his herd, by visual signals, by sounds, and telepathically—and the members of the herd depend on him completely. This dependency has evolved over millennia, and is now so absolute that the males and females have no independent sense of self-preservation—neither fear nor sex drive. They feel afraid when the prince tells them to, and they mate when told to."

"So the prince, with his greater intelligence, can suit the size of his herd to the available food supply by commanding reproduction when necessary, or by failing to warn a member of his herd of danger, when over-population threatens. And when the prince feels his powers waning, he is clever and unselfish enough to know it, and to cause one of his herd to bear a princeling."

Brewster regarded Miranda Marjoribanks with cold amusement. "I guess you could say that the prince is the personification of love. He devotes his whole existence to the well-being of his herd, and in return receives *nothing*. Due solely to the evolution of the prince-rule system, the skyhorses thrive on Vega. It's unlikely that so strange a creature could have survived under terrestrial circumstances. Even on their home planet they have many enemies—but the unthinking discipline of the prince-rule preserves the species. Take away the prince and what have you got?"

Brewster nodded at the forlorn figures of the skyhorses and

left the question hanging there. He picked up his bag and walked rapidly away to his hovercar.

Miranda Marjoribanks eyed the skyhorses without expression, but I could guess at the dismal profit and loss account which her calculating mind had drawn up.

"Dear Miranda, how good to see you. And Joe... And how are the darling skyhorses?" Carioca Jones bore down on us with Penelope in tow. The child ran straight to the animals. "I hope your friend isn't leaving on my account," Carioca added, glancing at the receding hovercar.

"What the devil are you doing here?" snarled Miss Marjoribanks.

"Oh dear—why do people make things so difficult? Miranda darling, I'm deeply sorry that you should have misunderstood my motives when I returned those dear animals to you."

"You what?" Miranda Marjoribanks's hostility had abated to suspicion.

"So let's let bygones be bygones. Just as if the whole wretched business had never happened. I'll buy the skyhorses back and you and I will be close friends again."

"What?" Suspicion now became incredulity. "Am I to understand you are conceding the issue, Carioca?"

"You could put it like that." Carioca was fumbling for her credit card. "I'll expect delivery later this afternoon."

Miranda Marjoribanks's features were transformed as she took the card. "How very sensible of you, Carioca dear. Such a pleasure to do business with you."

She embraced Carioca Jones effusively. The two women stepped back, smiling at each other. The sun was warm and the glow of Westaway's scotch was still with me. I grinned at them both, relieved that things had worked out.

Nearby, Penelope was squealing with delight.

Further away, the land fish lay peacefully basking. Pale green leaves dressed the spring trees and the ocean sparkled beyond.

In the middle distance, the skyhorses were copulating giganically.

REALLY, JOE, I can't understand how anyone could be so downright crooked. I mean, a deal is a deal. Really—I don't blame poor little Penny for being disappointed."

"On the other hand, it lets you off the hook. If Miranda Marjoribanks refuses to sell them, then you can't buy them, can you?"

We sat in the cockpit of *Flamboyant* with the twin wakes zigzagging erratically astern—an untidy testimony to Carioca's mood.

Her rage, when Miranda Marjoribanks had abruptly reneged on the deal on seeing the skyhorses mating, had been frightening in its violence. Now, after an hour of furious sailing, I'd persuaded her to run me down the east coast of the Peninsula to Westaway's place, where my boat was.

"Listen to me, Joe Sagar, I'm getting just a little tired of having my motives misunderstood. I bought those animals for Penelope because I wanted her to be happy. I sent them back because they were disgusting in front of a young child. I agreed to repurchase them because I'd heard they were placid again, and because Penelope was unhappy."

There was some excuse for what I said then. I didn't know what I know now. I'd known Carioca for long enough to think I knew the workings of her mind, and I'd just suffered two hours of the ex-3V star at her worst. Moreover, the liquor I'd

consumed earlier in the day had settled into a nagging ache behind the eyes—so I could be excused when I said, "What the hell does Penelope's happiness matter to you?"

Her eyes were bright with the wind flailing her face, with tears of rage, or of something else. Somewhere at the back of my mind I was aware that all the frustration of years had gone into my question, that I had no right to ask it, that Carioca Jones's dreams of a 3V comeback through that child were no business of mine.

She opened her mouth to tell me the truth. Long afterwards, thinking about it, I know she was going to tell me the truth—but at the time I expected another act, another histrionic outburst.

But she never got to tell me, because at that instant the starboard hydrofoil of *Flamboyant* struck the Creeping Reef.

The boat lurched as the bows dipped and I remember grabbing for a stanchion. I heard Carioca scream. Then I was in midair, the head plucking at my clothes, the water rising to meet me, a glassy blur. Somewhere I caught sight of the boat—vertical, frozen in a giant cartwheel. Then the water hit me, hard.

I struck head-first and was instantly in the cold depths, certain that my back was broken. I paddled feebly with my hands, my legs numb from that dreadful wrench when I'd hit water. I saw the surface above me, undulating in oily fashion. Another pair of legs thrashed there, and some irrelevant part of my mind found time to understand sharks, and the fascination which a moving body on the surface has for the brutes. Those legs looked very tempting, trailing bubbles, kicking in a manner suggestive of helplessness, of injury.

I broke surface. Carioca Jones swam nearby, her face a mess of eroded make-up, her eyes wide with fright.

"Penny!" she screamed, sighting me. "Where's Penny?"

Treading water, I looked around. At first I thought *Flamboyant* has gone straight to the bottom; the sea heaved empty around us. Then, as I thrashed in a panicky circle, the bulk of the boat appeared. It lay on its side, the jagged stump of the starboard hydrofoil projecting towards us like a crude amputation. There was no sign of the child. As the boat rocked with the swell the hydrofoil seemed to point unsteadily at us, an accusing finger.

"Can you swim that far?" I shouted to Carioca.

"We've got to find Penny!"

"I know that. She's probably still inside."

The wind was drifting the boat southwards, away from us, and it was a longer swim than I'd expected. Eventually I got hold of the cockpit coaming; the cockpit itself was awash. I climbed on board and dragged Carioca after me. Without even pausing to catch her breath, she clambered past me, making for the open cabin door. I followed, feeling sick. I'd caught a glimpse of the wreckage inside there. Dark water lapped at the slanting roof.

"Penny?" Carioca's enquiry was shrill with terror.

"In here." An unsteady reply.

"My God! Are you all right? Where the hell are you? I can't see a thing in here!"

"I'm OK. Hold my hand, huh?"

And the child emerged, bedraggled, dripping water from sodden clothes, but unhurt. Carioca embraced her, I kneaded her shoulder awkwardly, we grinned and laughed.

Then a lurch from the boat reminded us that the danger was not over. Clinging to the handrail, we surveyed the scene. A faint pallor on the water, a quarter kilometer away, denoted the position of the Reef. We were drifting away from

it, southeast, out of Wasp Narrows and into the twenty-five-kilometer width of the Strait. There were no boats in sight. The short March afternoon was already darkening into evening, and within an hour we would be a black shape on the black sea, invisible from land or air—unless *Flamboyant* had gone to the bottom by then.

I shivered, felt the others trembling beside me as the wind bit into our wet clothing.

"What are we going to do next?" asked Penelope confidently, secure in the presence of adults.

"Wait for a ship to come," said Carioca Jones.

I was silent, remembering that someone had once told me a man couldn't survive longer than twenty minutes in the chill waters of the Strait. The boat lurched again, and belched a huge bubble from some unseen rent in the hull. Evening was closing in on us fast. Penelope said, "What are those lights?"

"That's Daniel Westaway's place." I could make out the stumpy deckhouse of my double-ender against the blackness of the short wharf.

"He'll be able to rescue us," said Penelope.

"What the hell are you talking about?" snapped Carioca beginning to crack. "The damned fool's probably drinking in front of the 3V. You, Joe. You're supposed to know these waters as well as anyone. Are you proposing we sit here until we die of exposure?"

"Who put us on the Reef?" I asked shortly.

"My God! We're in peril of our lives and all the man can do is make accusations! Listen to me, Joe Sagar—"

"I wish you'd shut up, Carioca. You're making things difficult for Chagford," said Penelope firmly.

"No child speaks to me like..." Carioca's voice trailed away.

Coming in low over the water was the huge, pale form of the skyhorse, ghostly in the dim light. With neck outstretched he stalled, hit the hull of *Flamboyant* with an impact which threatened to capsize us, and clung with his great talons to the cabin roof. Standing there in the dim light, his head bent towards us attentively, he looked like some giant mythological bird of prey come to haunt us in the moments before death.

Penelope was immune to such fancies, however.

"I'll just go and fetch Mr. Westaway," she said casually, and climbed onto the skyhorse's back.

As frequently happens on the Peninsula, the climax of this strange affair was followed by a period of mystery and silence as the various protagonists retired to lick their wounds. In due course Penelope returned to her father, and Carioca—as is her way—plunged into a new social whirl with new friends and new enemies.

It was weeks later that I heard the tail-end of the story. The air was warm with spring as I stood with Daniel Westaway on his wharf, watching his hunting dolphins frisking in their enclosure as they waited for the tide to turn.

"One day I'll get rid of that goddamned reef," Westaway said. He spat thoughtfully into the water and a dolphin leaped, and I thought of his daughter, Diane, who seems to have a way with animals.

"I heard from the attorney today," I said. "Carioca's agreed to drop her salvage claim."

"That's good."

"Thanks." Six weeks ago Daniel Westaway had done me a very good turn. He'd put to sea and rescued Carioca Jones and myself—after recovering from his surprise when an excited small girl on a skyhorse told him of the accident—and

Michael Concy

towed the stricken vessel to safety.

Then he'd sent Carioca Jones a bill for salvage. Oddly enough, the amount of his bill was exactly the same figure as Carioca Jones was charging me for towing my double-ender. After an initial outburst of temper, she had realised this was no coincidence.

Westaway said. "The Marjoribanks woman's sold the skyhorses, then."

"Some exozoo bought them. I heard she took quite a loss. They never did mate again, after the day of the wreck."

"They couldn't. Like Brewster said—they needed a prince to tell them."

He paused. He knew what I was waiting to hear, but it wasn't Westaway's way to deliver a monologue. He needed a prompter. So I said, "I saw them mate several times."

"And I'll bet young Penelope was there every time. She was their surrogate prince, didn't you know? She had an empathy with them. That's how Chagford came to the wreck—even at a distance, he sensed the danger thoughts emanating from her. And if she was in danger, then their tiny herd of three was endangered—because only she could impel them to mate."

"Penelope made them mate? Hell, she's only a kid!"

He glanced at me, hesitated. "She loved them, Joe. And they sensed her love, and translated it in the only way they knew. She gave them what they couldn't get from anyone else on the Peninsula—certainly not from Miss Marjoribanks. Neither she nor Carioca Jones know the meaning of the word."

I left it like that. Later, as I drove home, I wondered why I hadn't corrected his impression of Carioca Jones. For several weeks I'd thought the same as he did, and I'd attributed her extravagant attempts to please Penelope to ulterior motives—the possibility of a part in a 3V series. Penelope's father was a movie director.

And then, quite by accident I'd learned the truth from Dale Finlay, a probing reporter for *Newspocket*. The movie director was Carioca Jones's son-in-law.

Penelope was her granddaughter.

I didn't bother to tackle Carioca about it. If there was one thing the ex-3V star would never admit—if there was one truth she would deny with all her acting skill—it was the fact that she had a granddaughter.

—G—



56 GALILEO

CHANGELING



John Taylor

CHANGELING

John Alfred Taylor

THE LUNAR SURFACE was at ferocious afternoon, but neither glare nor shadow mattered to the changeling's photochromic lenses. He opened the end of another pack of solar cells, and did the lunar lope along the pre-fabbed frame, slapping them into place. "How long to quitting time, George?" said Murphy's voice in his ear. Murphy was a hundred meters away, over at the next unit, moving pretty well for a man in a full suit.

George brought his built-in absolute timing circuit up to consciousness. "Seven hours twenty-four minutes and seventeen seconds."

"Goddamn," said Murphy. A moment later, "You know what I'm gonna do when I'm off shift?"

Prolonged discussion of this subject was what you paid to work with Murphy, and it passed the time without distracting you too dangerously.

"Yeah, Murph, I know. First you're going to drink the bar at Spiffy's dry, then you're going to finally score with that redhead—"

"How'd you know?" said Murphy, then laughed. "I do run off at the mouth. What you gonna do?"

"Pack," said George. "pack."

"You're really going down, really going to the Big Blue Marble?"

"Yeah," said George. "It's that or split—Leah says she's got to see grass and trees—"

"What about City Center Well?"

"Under an open sky. Leah says."

"She knew what the Moon was like. George—she was here months before you met her."

"Maybe that wasn't long enough." She'd called him a

leather-faced freak, too, but he wasn't going to tell Murph about that.

"How long you gonna be down?"

"Two weeks. At least I have arch supports."

"What if she don't wanna come back?"

"I don't know," said George. "Like I told her, what good's a changeling on Earth?"

The call tone sang. "George? Charlie here."

"Yeah, Charlie?"

"How long you been on workfood?"

"A little over six hours—Why?"

"How much longer could you go on workfood if you had to?"

"At least ninety-eight, hundred more hours."

"Then come on in."

"I've only been on shift two hours, Charlie—Murph's just come on."

"I know. But I want you now."

"Charlie—"

"Come on in. Your replacement's in the lock, and you'll get paid full changeling wages the rest of the shift."

"What's going on?" said Murphy.

"Curiosity killed the cat," said Charlie.

"I ain't no cat," Murphy said.

George headed for the airlock beacon, passing his replacement looting out.

His earlamps and nostrilplugs opened automatically when the lock had pressure, and all George had to do was squeeze the safety clips to pull out his breather mouthpiece, and kick off his moon-shoes. As he came out into the lights of the Concourse, his exoskin shifted from african to oyster gray, and when he crossed the sunlight and trees of City Center Well, George went halfway back to reflective albino.

"What the hell is up?" George said as he pushed into Charlie's office, and then noticed the other man. A groundie, from the cut of his kilt, and then George saw the emblem at his lapel. The Outspan Consortium. Whatever was going on, it was big.

"Harry Bolitho, George. Needs to go to L-5 right away."

Bolitho held out his hand.

"Then he can go with somebody else," George said. After a moment Bolitho let his hand drop.

"There's only you," said Charlie.

"Forget I was on vacation as of tomorrow?"

"I'm sorry, George. But the regular ship isn't for three days, the *Tristan da Cunha*'s off on a contract job, and he can't charter the *Copernicus* because it's refitting—so he has to ride a cargo frame."

"Charlie, if I don't take Leah down to the Big Blue Marble as planned—"

"You have to take Mr. Bolitho to L-5."

"I quit."

"Mr. Grieve," Bolitho said, holding a leather folder open for George to see, "this identifies me as a Courier of the World Federation. Refusal to assist a Federation Courier in the performance of his duties can carry a penalty of imprisonment for a term of not less than a year. And I'll have you blacklisted as well."

"I didn't know Outspan was the World Federation."

"In this case their interests are the same. I dislike having to use threats, but it is vital I reach L-5 as quickly as possible. It was great good luck I was on the Moon when the emergency arose."

"Not for me," said George.

"Boosting out of Earth's gravity well would have added an extra day," Bolitho went on relentlessly. "You will be adequately rewarded for the interference with your plans."

"My wife won't think so," George said.

"Call her now," said Charlie. "If you explain—"

"Explain!" said George, but he keyed the phone.

Leah looked out of the screen. Seeing her nightblack hair and blue eyes, George realized how much he needed her.

"Honey," he blurted, "we can't go to Earth tomorrow. I have to fly somebody to L-5 right away."

"You have to go with me, George. You promised."

Bolitho came up beside him. "Mrs. Grieve, he has to take me to L-5. He has no choice, because I have ordered him to, in my capacity as a World Federation Courier—there are legal penalties for noncompliance."

"I don't know who you are—"

"Harry Bolitho—"

"And I don't care, but I know he promised. I'm going to Earth tomorrow, George, either with you or by myself."

"But honey," said George, and the screen went blank. George tried his home number again, but there was no answer.

"See what I mean, Charlie?"

"I'm sorry about this," Bolitho said.

"You're sorry?" said George.



HEY BROUGHT BOLITHO'S life support capsule right into the office, checked his blood pressure and metabolic readout, and put him in. Bolitho didn't blink when they put the IV and blood-pH needles in, he was so busy talking.

"The timer is set to put me to sleep in 30 minutes, so I will be able to monitor your communications before and after liftoff, and it will wake me an hour before we reach L-5."

George felt himself flushing under his exoskin. "I don't like you very much, Bolitho, but why all the precautions? I'm just an ordinary spaceman."

Bolitho stared up as they adjusted the electrode pads at his temples. "These negotiations are too delicate to risk any leaks." The lid of the capsule came down and locked in its gasket, but his voice was even louder in George's ear. "And there'll be an inertial navigation recorder locked to the center beam so you'll have to steer the course you're supposed to."

"You are nuts," said George. "If I don't steer the course I'm supposed to, I'll be dead. Changelings breathe too, you know."

"Nevertheless," said Bolitho. They started the dolly. "Now come along, so I can hear everything you say."

"Like for instance I think you ought to have your head examined?"

"I really don't think I'm clinically paranoid," said Bolitho. "Extreme suspiciousness is an occupational hazard."

They tracked him right through the freight lock and hoisted him into place on the cargo frame. The cargo frame was just that, a spidery congeries of compression strutting and pure iron whisker tension cables around the central beam, and with only two strap-on tanks, the control module almost seemed to float above the thrusters and landing stilts.

George rechecked every linkage and shockcord himself. "I thought you didn't like me," said Bolitho, watching through the capsule lid.

"You're my passenger—or my cargo, whichever you prefer," said George. "And it's my neck, too."

George levered his legs under the board, flat on his back on the acceleration hammock, then plugged himself into the

computer.

"How long now?" said Bolitho.

"Three minutes ten seconds and counting—and listen, Mr. Bolitho, be quiet for the next five minutes, and then you can talk to your heart's content. We're going to be traveling by laws even Outspan can't touch."

"You're the pilot," said Bolitho.

George listened to the readouts as the ship checked itself, almost like listening to his own body. And the ship was his body, in a sense.

George listened to the intermingled voices of the ship and Field Control, his hand hovering over the *Go/No Go* switch until the clock started the cold thrusters right on the tick and they lifted nice and clean. Ten kilometers up he rolled the ship till the two sets of crosshairs on the screen were perfectly superimposed and turned on the hot thrusters for the long burn.

"OK, Bolitho, now you can talk."

"We're on course already?"

"As close as we can be till we're out far enough for error to show up on the laser triangulation."

"You take your job pretty coolly, Grieve."

"The same way you take yours—except I'm a licensed spaceman and you're a professional S.O.B."

"Only when it's necessary. If there had been any other possibility..."

"What about my marriage?"

"The resources of the World Federation will be at your disposal."

"*All the King's horses and all the King's men*"

"*Couldn't put Humpty Dumpty together again.*"

"Still, I'll give you some communication to monitor. Though I'd rather you wouldn't." His rear antenna was slaved to Field Control, and he had them patch him through to the phone system. If Leah would just listen to him.

The phone was busy.

Three minutes later he tried again, the phone was ringing. He let it ring twelve times before he disconnected.

"Your wife?"

"Yeah."

"I wish it didn't have to be this way. But you were the only possibility." George couldn't quite figure out if that was supposed to be an apology or just a statement of fact until Bolitho added, "Look, we're going to be with each other for awhile. So why not call me Harry."

"OK, Harry. As long as we're going to be so buddy-buddy, what are you rushing off to L-5 for?"

"I'm afraid I can't tell you that, George."

"I guessed as much. It doesn't really matter, anyway. Like the view?"

"It is rather breathtaking. I've seen space many times, but never quite this close."

"Too bad we had to sling you there, it would be more interesting if you could look over my shoulder. It can get boring though, but you won't have time for that—you're going bye-bye in fourteen and a half minutes."

"Exactly what the capsule clock says. How do you know?"

"Built-in absolute timing circuit."

George tried to get through on the phone one more time before Bolitho went into hibernation.

And after he went into cold sleep, George took a very long look at Bolitho's metabolic indicators on the remote teletale clamped onto the corner of the board. Bolitho was a tricky one. But he was out for sure.

George still had a few minutes before he was out of range. He patched into the lunar phone system again. His home phone rang and rang. Finally he tried Charlie. "Charlie? George. I'm almost out of range. I've tried to get Leah four times and she doesn't answer."

"I tried, George. She hung up."

"Well, keep trying. Bolitho's fast asleep, Charlie. Do you know what's going on?"

"Nothing definite, but a pretty good idea. From what I hear the people out at L-5 are tired of being just Outspan employees—their *de facto* status, no matter what the Federation Compact says. Outspan just overrode the L-5 Council again, and they're hopping mad. There must be some sort of ultimatum, because Bolitho was sending and receiving encrypted stuff on my phone half the morning. Kept me down at the other end of the office so I couldn't read it. But you can see why he's in a sweat."

"Sure can. I'm almost out of range, better sign off now. But keep trying to get Leah."

"Sure will. See you, George."

"See you."

But all George could see now was stars, and the Earth down to his right. Except for the steady I-G acceleration, he had little sense of motion; the stars remained unchanged, though the Earth grew gradually smaller as he rose into a high orbit. Since he was going west even the sunset line, the "loonie's clock," hardly seemed to move, and weather systems changed almost imperceptibly.

George was not bored, but seething—cursing Bolitho, wondering if Charlie had been able to talk to Leah, remembering their last quarrel. Better stop thinking this way, he had a long way to go alone. If he could only think about something else, the way he had on earlier flights to L-5. He'd lied to Bolitho, the view was hardly ever boring. He had spent hours in rapt contemplation of the lights around him. Except when he had to do something—which reminded him, wasn't it about time for the first nav check?

Two minutes thirteen seconds.

The pulsed lasers from Plato and Flamsteed came in only a few microseconds late, which meant he was almost on course—he must be doing something right—and the course correction took only a second's vector burn.

Then he was back alone with himself and his hibernating cargo. Time to eat. He unclipped a tube of workfood and stabbed the bayonet valve into his breather mouthpiece, stretched his lips sideways and began to suck. Overpressurized again. Like to catch the quality control engineer and fill him with air.

Weird. He was eating workfood out here and Bolitho was in cold sleep because last century the Mayo Clinic had committed indignities on hibernating bears, and thanks to DNA manipulation, he was able to switch to "fat-burning" more easily than the average male athlete. The Colonel's lady and Judy O'Grady and George were bears under their skins.

And Leah was where? She said she'd go down without him.

He couldn't do a thing here. Except get to L-5 alive. And if he kept thinking about Leah...he remembered a childhood story. The hero would win everything, the princess, the kingdom, all the standard stuff, if he didn't think about a white horse. So he thought about white horses all night long.

George remembered a "night" a few weeks before they were married, with City Center Well illuminated only by a Full Earth. Leah had smiled up at him in the silver light and her look had seemed to say everything.

But she'd certainly said enough the last time. That's when she'd screamed only freaks lived in caves, freaks with leather faces, before she caught herself. "I don't mean you, George."

"Sure," he'd said, "not you. You're not like the other tourist ladies. You come to the Moon and see the exotic native, more exotic if they're leather-faced freaks, but you get carried away enough to marry one."

Not that other, more temporary tourists—lots of them—hadn't been turned on by his exoskin and codpiece and antenna-crested mask.

There were ways of not thinking about white horses. Like thinking very hard about adrenaline and oxygen consumption. And breathing correctly. And naming the stars. And not thinking consecutively unless you had to.

But tomorrow he was almost calm.

GAF," SAID BOLITHO.

"Rise and shine, Harry," George said, watching the metabolic telltale just in case.

"Can't I just have a quiet funeral?"

"You are going to live, Harry, live. The screen says so."

"Damn sadist. Thought you were a simple spaceman."

"Full oxygen and the mood shot'll hit you any second."

"Good to know," said Bolitho. "Think I'll make it?"

A moment later, "You're right. How far are we?"

About an hour out, like you wanted. Already homing on the beam." George wasn't going to tell Bolitho what else he was doing with the beam—what Bolitho didn't know wouldn't hurt him.

But his right hand was telling his left hand what it was doing, moving over the keyboard under the exoskin of his left wrist and talking through the computer and down the navbeam to L-5, and getting their answers in the optical readout in his left eye.

Bolitho high Outspan mukymuk on sked, he spelled out. What he want? What yr ultimatum?

And coming back much quicker in cool green lines inside his eye: *Who U?*

George Grieve pilot. Lunar citizen 89655411.

Need to know?

Curiosity.

Call that need to know?

Why not? Personal. U give Outspan ultimatum?

R U a turtle? How yr passenger take it?

Gd enuf. Tuf old SOB. Hate his guts but personal. Watch yr privates. Hes very gd.

Thnx yr advisory. Sure U dont likeim?

Ye need to know? End trans. Maneuvering.

Uneud trans. Maneuvering advisory. Cum in careful.

Why?

Sum our hotheads even against negotiations.

U mean sky full of erud?

I mean so.

Thnx yr advisory. But cunt cum in more careful than usual. End trans.

"George?"

"Yeah, Harry?"

"How's it going?"

"Near perfect." No point in worrying Bolitho for nothing.

"I couldn't tell."

"We're just great. You'd know if you could see." That was so; the L-5 colony was blinking ahead, from Aldebaran and the Hyades. "And what are you going to do about their ultimatum?" George said in the same easy voice.

"You know about the ultimatum?"

"Enough," George said. "Doesn't everybody who matters know?"

George could hear Bolitho breathing before he laughed like a rusty hinge. "I guess you're right."

"Our problem right now," said George, "is exact matching of vectors. The Colony goes round the L-5 point, orbits it, if that's the right word—"

And then it happened. They were passing across a construction area, an enormous open grid framework, when George saw something flashing viciously up. Instinctively he thrust out his left arm as it struck.

Since they were in free fall at the moment, only the stirrups held him down, and the next thing George knew the stars were rotating around him and his left arm hurt like hell. Broken?

Then he heard Bolitho shouting his name.

"Harry. Shut up. You're all right. I am, too. Shut up a minute."

And Bolitho shut up, though George could hear him gasping. Even with an immovable left arm, George was able to stop his rotation and spot the dwindling cargo frame.

The oxygen line between the ship tank and his breather pack had been designed to fail safe, so he had some air.

He tried the cargo frame's call and command numbers on his wrist keyboard, cued in the autopilot. If his keyboard was still working...

But it had hit his left arm hard.

"George," said Bolitho.

"A moment more, Harry. Then we talk."

George hung waiting among the unblinking stars. Then the cargo frame was turning toward him, he could tell from the reflectors. He eased it back on the vector jets, and when it was close enough, reached over with his good arm to grab the frame.

"What's wrong?" said L-5 Control.

"Had a little trouble," said George. "Under control"

"Hi, Harry," he said, hanging above the capsule lid, "I told you you could talk."

"Most of the time you tell me I can't," Bolitho said.

"A half hour," George said, "and you'll be doing the talking you're paid for. Good luck with the L-5 ultimatum."

"You still won't tell me how you found out?"

"A little spacebird told me," said George.

Surprisingly, Bolitho chuckled.

And then the docking transponder began beeping, and the rest was nearly automatic. When the docking probe locked, George just hung in the stirrups; his arm hurt even worse, and the rest was up to somebody else.

But then L-5 Control broke in wanting to know what had happened. He was being recorded, and anyway it could have been an accident.

"I'd say a piece of tubing about a half-meter long from what I saw before it hit me—couldn't be going too fast or I'd be dead. A low radar cross-section, of course, and I was too busy to see which way it went."

TWO HOURS LATER George was sitting at a cafe table, sipping the "wine of the country"—a convincing imitation Burgundy—and feeling much better. His arm was broken, a simple fracture of the ulna, and as soon as the doctor had finished with him, the L-5 legal service had taken over, apologizing and arranging fullest possible compensation.

But he had tried to call Leah on the Moon again, and tried Charlie when there was no answer. Charlie had had no better luck, had even had her paged at the terminal, but she had lifted for Earth for sure—her name had been on the final passenger list.

"Admiring the view?" It was Bolitho. "They said I'd find you here."

"As much as I can," George said.

"What's wrong?"

"Wife—She did leave."

"Sorry," said Bolitho as he sat down.

"Thanks a lot."

"You were the only pilot."

"Yeah. Try some of this fake Burgundy—it's pretty good."

Bolitho didn't look too happy himself, as they sat looking out across the curve of the fields and trees rising over their heads.

"Something wrong?"

"They won't give an inch. So I called a break and came to see how you were doing." He sipped his wine silently for a moment. "You saved my life, George."

"Don't exaggerate. They would have come and picked you up in plenty of time."

"Still—"

"My job." He changed the subject. "You say they won't give an inch?"

"No, and that's some ultimatum. If the Consortium doesn't give in"—he looked at his watch—"in...ah...twenty-two hours, well, you know Orbball?"

"Big chunk of nickel-iron—they aren't going to push it down on Earth?"

"Now you're the one who's exaggerating. They're not savages... Besides, L-5 is too good a target. No, they'll just destroy the controls of the automatic smelter. About as total as blowing it up."

"Cutting off their nose to spite their face."

"They are determined, George. And they threaten to do the same thing to the ball-bearing factory. And the zone-refining plant."

George whistled. "All they want is an end to Outspan's interference in their political affairs? The Consortium remains owner?"

"Except for the residential cylinder—they take sovereignty, but have a twenty-year compensation plan."

"Well," said George, "it looks like they have you. Either you lose a lot and they lose, too, or you lose a little and gain a little. Give in. I'm naturally biased toward L-5, but I'd advise the same thing if I were neutral. Give in. And fight for every possible financial advantage for Outspan."

Bolitho frowned. "I wasn't sent out here to give in."

"What else can you do? But give in kicking and screaming. Can you think of anything better?"

Bolitho looked through his wine glass at the sunlight coming in through the sky strip. "No," he said, "you're right. I can't."

The earth shuttle left before the lunar shuttle, so George saw Bolitho off in the zero-G hall of the docking hub. "Thanks for everything, George, including your advice. Sometimes a man doesn't want to see what he already knows. Now all I have to do is sell it to the Board."

"Just ask them what I asked you."

"Can they think of an alternative, you mean?"

"Yeah."

"I hope everything works out with your wife. The Federation's resources are at your disposal, remember."

"All the King's horses—"

"Maybe. But just in case."

"OK." The louse was actually sorry.

"Oh, by the way, George. I told the L-5 Council about your advice—after everything was settled of course—and they intimated they'd like to have you aboard. They were impressed by your handling of the emergency, too."

"I've got a wife back on the Moon—not on the Moon now—anyway, I've got a wife."

Then the boarding call sounded.

"Well, back to face the music," said Bolitho, squeezed George's hand, and began pulling himself along the line to the lock.

"Good luck," said George.

Though he knew it was pointless, George found himself hurrying. Even if Leah had gone on to Earth, she might have left a message. In the crowded Concourse, George was glad of his unreadable eyes and the fixed metal-and-plastic grimace of his breather mouthpiece gasket. He turned down Blue Street, rushed down Willow Tunnel toward his door.

There was no note anywhere, but when he checked the phone recorder there was Leah's voice, "Call Earth 212-288-4511." Just that.

"Roget, Mundy and Mundy," said the girl on the screen.

"I'm George Grieve. I was told to call your number. Is there some mistake?"

The girl glanced down at a readout screen. "Oh no. If you will hold."

"I'm calling from the Moon," said George.

"It will only be a few seconds."

It was, but long enough for George to realize what a name like Roget, Mundy and Mundy implied. And when the smiling young man in conservative tunic appeared George groaned soundlessly.

The whole thing took very little time. No, he would not tell George where she was... yes, a client's privacy was privileged... yes, he understood how George felt, but professional ethics demanded... on grounds of incompatibility... did George want to enter a counterplea?... was the property settlement agreeable?... no, he couldn't tell George where she was... would he signify his assent vocally and by thumbprint?...
All very civilized.

After it was over George got drunk on Old Vacuumstill. It didn't help much, but it kept things from connecting. He remembered her talking about the open sky and clouds. It really wasn't her fault, the bitch. Maybe it was all a mistake, maybe she'd changed her mind, and there was a later message on the call recorder.

There was. From Charlie, telling him his wages and bonus from Outspan and the compensation payment from L-5 had been transferred to his account.

And all George could think, pouring himself another shot, was how glad he was it had come after the property settlement. Served her right.

Served her right.

—G—



THE HEIRS OF JOSEPH PENN

M. Lucie Chin

MARTIN PENN LEFT Dave Norton's office feeling the psychiatrist was nearly at the end of his usefulness. After four years of intensive and often intense counseling, Martin was spending almost as much time educating Norton as he was seeking his help. The man couldn't be blamed. He had no way of knowing how the Link Effect Martin had been painfully learning to live with over these years was reshaping and enhancing his life. Norton had nothing to do with that. His job had been to help Martin cope with the fact that he was both a clone and a human being at the same time. On this score he had been well served. He felt more fit and whole than he could remember feeling in his entire life and he did not care to question how much of that was Dave's doing and how much was the support, comfort and understanding his brother-clones had fed him across the Link. He had needed them all and they had done their best for him. But Norton could not be a part of his life forever and Martin felt a terminus approaching.

The wind was sharp as he crossed the park in the fresh

dusk. It was the sort of April day which didn't know if it was to be kind or cruel. The sun had been warm in the afternoon as he walked the windsheltered side of the avenue uptown, but in the open it still bit of March and the light drizzle, taking up a dull moment passing the boat pond, reminded him of the cab but he had been feeling pretty good about himself all day and figured his luck and the rain would hold. It was past rush hour, traffic was light and he was too far into the park to expect to hail anything. He crunched along the path and wished Julian could read his mind and have coffee ready when he got in. If any of them were paying attention they would have picked up on the embarrassed kick he had given himself for getting caught in the rain. They might not know who or why but they would all share an awareness of his state of mind as he shared theirs. Right now, there was a general quiet on all fronts ranging from bored to the kind of blankness one gets performing well-worn routines.

Martin was still not complete master of his share of the Link. It intruded at times. Shifts of mood, small annoyances, sudden pleasures were distracting but most of the time he felt he functioned as well as any of them. It had been quite a while since he had sent the others climbing the walls.

Deciding to play with the Link, he looked for a way to increase emotional output without actually having to experience it. Nothing internal suggested itself so he began paying more attention to his surroundings. It was full dark and the rain had stopped. He listened to the sound of his feet on the pavement and became suddenly aware that he was not alone. One never felt alone with the Link but this was an actual, physical presence, somewhere behind. Martin passed through the light and dark intervals of the sparsely lit walk without looking back. Just another dummy without the brains to take a cab? He slowed a bit but the footfalls came no closer. He quickened his pace. The spacing remained. Odd, if he was going to get mugged, he thought, the guy would be trying to catch up. Guy? It didn't sound like a woman's walk. Long strides like his own, a bit heavy-footed. He felt his anxiety rising but did not want to acknowledge it, let alone confirm the menace. Besides, he could see the lights and traffic of Central Park West. Relieved, Martin quickened his pace and assumed a jauntier gait as he turned out of the park and headed north. He took a casual glance over his shoulder as he entered the moderately-peopled street and saw a man emerging from the park. Just a man. About Martin's size, though heavier, wearing a raincoat and hat, no umbrella. He also turned north. Just a man.

Martin shook his head and chuckled softly to himself as he crossed at the light. Examining that little corner of his mind the Link seemed to call home he found a slight increase in alertness. At least he had gotten some of them to wake up.

A couple of blocks farther, Martin turned west. The man was still behind and across the street going north. At the market on the next avenue he stopped for milk and eggs. Jesse was coming for dinner so he decided to pick up an extra bottle of wine at the liquor store. When he emerged with his groceries the man was across the street peering into a shop window. Martin stopped and stared. The man did not turn around. Half a block later, browsing among the bins of Rhine wine, Martin saw him again, looking at the display of bottles in the window. The man did not seem to take notice of anything but what was immediately before him, but Martin was growing uneasy again. He browsed closer, studying the face in the window furtively. It was no one he knew but it gave him an odd sensation—of what he could not say. He edged

closer. When he looked up, the figure was gone.

Two and a half blocks to the apartment. Every step grated on his nerves. There were few people on the street, but enough that he could not tell if he was followed. He felt silly but considered circling the block just to be sure. It was not necessary. As he entered the last block and crossed the street he heard footsteps behind him.

All the small things that can go wrong with a simple act conspired to strain Martin's wits as he fumbled with his groceries and the old-fashioned key lock at the front door. He kept telling himself it was ridiculous to panic, but the more the lock resisted the more his nerves screamed. He got it open at last and as he closed the heavy door firmly he saw through the window that the man was waiting by the light half a block back across the street again.

Once in the lobby, Martin realized that for the last several minutes his own unreasonable panic was not the only agitation within the Link. He tried to calm himself as he took the elevator to the fifth floor. The new palm lock on his apartment let him in without a fuss and he sighed and leaned on the doorjamb and let himself feel honestly relieved.

There was a fire in the corner fireplace and the smell of hot coffee. Julian was in the little alcove kitchen pulling nails out of hot potatoes.

"Are you all right?" he asked looking up, plainly concerned.

"Yeah," Martin sighed. "I'm OK."

Julian put down the last potato. "I knew it was you. What happened?"

"I think I was followed."

"What?"

Martin started to repeat himself as the phone rang.

"Get that, will you? I have to finish this. Jess is due any minute. It's probably a brother. Jonathan just called to find out if you were OK."

"Am I that obvious?" Martin asked putting down the bags and crossing to the phone.

"Let's put it this way, who else would walk through the park alone at night and scare himself to death?"

"How did you know I walked?" Martin said indignantly.

Julian glared at his watch.

"How'd you know I was alone?"

"Just answer the phone," Julian said, searching for potholders, "and when you're done clear off the couch, I'm going to put everything on the coffee table."

Justin was on the phone. Martin assured him everything was all right, he had let some stranger in a trench coat get on his nerves and he'd calmed down now that he was home. He had, in fact, calmed down a great deal. At the moment he mostly felt chilly and wet and in imminent peril of a cold. But mostly wasn't totally and an edge of uneasiness stayed with him.

Julian banged around in the kitchen looking for things, slightly irritated by the persistence of Martin's mood. He looked up from the oven to find Martin standing at the window peering into the rain.

"For heaven's sake," he said. "If you can't clean off the couch at least go change your clothes before you catch your death."

"He isn't out there any more," Martin mumbled. "Or at least I can't see him."

"Who?"

"The man who followed me."

"Here?" Julian now sounded alarmed but his feeling was

more incredulous.

Martin nodded as Julian came around the countered half-wall dividing the alcove from the living room. He stood by Martin and shaded his own piece of glass. They could not see their side of the street but they could see most of the other side. There was no one in sight.

"Are you sure?" Julian said into the windowpane. His breath frosted the chilly glass.

"As sure as I can be without any way to prove it," also to the window. "I first noticed him near the Sheep Meadow but he could have been back there all the way from Dave's for all I know. I made a couple of stops on the way home and he stayed right with me. I even got a pretty good look at him at one point."

"Oh?"
Julian put the groceries away and poured coffee while Martin changed his clothes and described the man from the next room. As he talked he realized what he had seen wasn't worth much. It not only identified several hundred people but himself and all his brothers. It lacked specific detail. It was the odd familiarity that bothered him. He was sure he did not know the man. Julian suggested it might be someone Martin had met in Chicago before he rejoined the clone.

"Maybe," Martin said coming out of his room in blue jeans and t-shirt. "But I don't see why he would work so hard following me when all he had to do was ask."

Julian was rummaging in a drawer. "What can I say, it's weird. Clean off the couch, will you?"

Martin found that even with the strangeness fresh in his mind Julian had a potent calming effect on him. From the first day they met it had been so. That was one of the reasons Martin lived with him. He was strong and stable. He was also patiently relentless. Besides, they liked each other. At their first meeting Julian had cried. Martin was very touched. No one had cared for him that much in a long time. But he soon learned it was not a trait his brother displayed readily. Martin came to appreciate how much of a strain his unassimilated presence put on Julian that first day and over the next few weeks before the others slowly began coming back. Martin discovered he could have been truly dangerous and it took all of Julian's formidable strength to cope with him at close range in the beginning. His brother was almost as rigorous a taskmaster as the Link itself but as the lessons became more routine and Martin's life became more normalized, he and Julian had emerged friends. There was something special between them, no matter how close they were to the others, and everyone knew it. There was no hiding from the Link.

The bell rang, and Martin buzzed Jesse in. He was over his fright and ready to forget the whole thing but Jesse was a warm spot of vigorous curiosity in the midst of a general placidity. Martin and Julian knew it was coming, but they did not expect the form it arrived in.

"What the hell was he doing here?" Jesse said with mild pique in his curiosity.

"Who?" Julian asked, scrutinizing an open bottle of wine.

"Joe Penn."

Martin was surprised by Julian's reaction. It ripped through him like the shock wave from a small earthquake.

"Where was he?"

"The front door. He was going out and he gave me this funny look as I passed."

"He must have been checking the mailboxes," Julian mused.

"I thought he wasn't supposed to know about us," Jesse

said.

"He's not," Julian muttered.

"Anybody care to tell me what's going on?" Martin asked.

"So what's he doing down there?" Jesse gestured toward the street, plainly annoyed. "He knew me. Maybe not which one, but . . . you know." He was squinting his eyes, thinking back. "It was kind of smug—like I wasn't supposed to know him. Unfriendly, too."

"Fellas . . ."

"Does he realize you recognized him?" Julian asked.

Concern mingled with his doubt. "I don't know."

"Does it matter?" Martin asked.

"Hard to say," Julian said attending his wine once more.

"Sit down, Jesse, Martin, things will get cold."

"Wait a second!" Martin snapped as his brothers turned away and Jesse took off his coat. "One of you owes me an explanation. Damn it, he followed me home."

"Scared the wits out of him before he got in the door,"

Julian said from the kitchen.

Jesse took a seat on the couch, arms spread along the back. "I don't like this, Julian. What can he want?"

Julian put crusty, golden cornish hens and baked potatoes on the table and returned to the kitchen. "I don't like it either, but there's nothing we can do about it just now and I put a lot of work into this meal."

Martin took the ottoman across from Jesse. "Come on, brother, share the wealth. I hate having to worry about things I don't understand. Is this guy who I think he is?"

"If it's our donor you're thinking of, no."

"He's been dead about eight years," Julian said bearing in his second load.

"Seven," Jesse said. Julian nodded and went back to the kitchen. "This is the old man's natural son."

That fact struck hard. It was the first time he had considered the possibility of blood relations beyond the clone.

"He's a half-brother, then," Martin said.

Julian seated himself beside Jesse and began serving. "If you want to futz around with genealogy he's more like a nephew. Since we are genetically identical to Penn senior he was a twin rather than a parent."

"Yes, I know that," Martin said.

"So where does that leave his kid?" Julian said rhetorically and answered himself with a shrug.

"Where it leaves him is outside," Jesse said over his wine.

"He's about 18 years our senior, Martin. Elder Penn was involved with the CRDP all his life, career-type, you know, we've got an officeful ourselves. The whole subject was under government wraps then. No one was allowed to go home and tell his wife what kind of day he'd had. Joseph Penn was a book man. Donors, though screened, were strictly voluntary. I don't know what prompted him to do it. We never knew him personally, but I have heard it said he wasn't too happy with the product of his loins. The son's character didn't seem to bear up too well under close examination. However, workaholics don't make the best parents and a total secrecy edict would hardly help."

"Never mind whose fault it was," Julian said. "The point is the family was never told. Even when things came out in the open, the donors were given the option of anonymity. Penn opted. You have to look a long way before a project appears by name. All the readily available public documents bear only the coded project number."

"We knew about Junior. Senior's file is quite complete, at least up until ten years ago when he retired. You ought to look

it over."

"It's dull," Jesse muttered.

"At that point junior was 37, married, kids, he'd just bought into a trucking firm, had a house in Hackensack—no character analysis, just statistics."

Martin helped himself to more wine. He felt safe, even a little brave in his brothers' company. "So how'd he latch onto me?"

"Don't know," Julian said. "That's what bothers me. That, and why."

"Let's face it," Jesse said, "for a man who knew Joseph Penn for 40 years we'd be pretty hard to miss. The CRDP is easy enough to find. All you need is a phone book. Hang around till someone leaves, if he looks right follow him. Check the mailbox just to be sure. Martin always leaves ahead of us on days with Dave. He probably waited till you were through and it was just his luck you decided to walk."

"So now he knows there are two of us," Julian mused.

"Three," Jesse said.

"How would he know you weren't me?"

"True."

"Why not eight?" Martin said. "If he's been at the records he'd know about us all."

"No," Julian said sitting back, contemplative. "We're just a bunch of payroll numbers. I don't think he knows as much as he might. If he did, he wouldn't have had to follow you."

"I wonder," Jesse said.

"Well, you can wonder all you want. Myself, I'm going to have a talk with Tony Dates tomorrow. You're welcome to join me."

"Count me in," Martin said, starting on seconds.

"Right," Jesse agreed. "But tonight I think we should call the others. There's no telling where junior may turn up next."

THERE WAS A GENERAL MEETING in Anthony Dates's office the next morning. It was crowded. Julian had called barely ten minutes after Dates arrived. A few moments later he became acutely aware of how small his office really was.

He was a lean, precise man in early middle age and had worked for the CRDP for 22 years. This was his fifth year as general manager of the Penn Project but only rarely did he see all eight Penns at once. The clone's internal self-management was impressively efficient. They were the most highly-rated research group in the entire program and occasionally he wondered what he was there for—Julian knew the job nearly as well as he did. Mostly he saw them about minor things or in passing in the halls.

If he had taken the clone for granted up to that point he never would again. Having gained the intimacy of his office the presence and weight of the eight men was impressive, reinforcing the image of their own solidarity. Ranged about the room they were an asymmetrical moving sculpture which continually changed shape as individuals moved into or through the massed assembly. Dates found himself momentarily struck by wonder. Had he ever actually *tried* to know them except superficially? He did not like to admit that the name tags worn by all CRDP staff were a blessing in one way in particular. He had spent most of his life on clone projects, yet for some reason he found confrontation with the group disquieting.

Jesse was the last one in. Dates was sure. Particularly when he closed the door and leaned on it. Jesse was one of the

ones he could pick out *sometimes*. It was amazing, when one bothered to look closely, how diverse their personalities were, how dissimilar their tastes.

Jesse Penn had a temper. When he was displeased people tended to hold their breaths. There was about his manner at such times, something which made silent threats. It was unconfimable, but Dates thought of him as a violent man. He had heard war stories about Jesse and the previous project manager. When displeasure resolved itself into open anger only his brothers could reason with him.

Julian wasted no time, and as Tony Dates listened and nodded slowly he began to feel he did know his role after all. He saw himself as a buffer between the insular world of the clone and the rest of mankind. It had never occurred to him that on some levels this buffer was not only inefficient but possibly unappreciated. Last night, a major flaw had manifested itself and he agreed that it was perturbing—but not unexplainable.

They were being sued. The gist of the matter was that money Joseph Penn had left to a government project number for research was not a legal transaction even though the will had not been contested at probate. Penn based his action on the fact that clones had no status, recognition, or definition under the law and therefore had no right of inheritance. Further, he had come up with several reasons to deny them any right of bequest.

Overlaying the welter of emotional agitation packing the Link there ran a wave of pure shock. If Dates had been looking he might have seen Jonathan cringe slightly or Justin and Julian trade glances. What he did see was Jesse scowl but he did not understand. Without missing a beat he continued to tell them that the legal department was not the least bit



worried. Any idiot could sue for any half-baked reason he cared to pay for, no one ever said his cause had to be viable. Legal insisted it was nothing more monumental than a nuisance. The money was not left to the clone, which had never been mentioned in the will, but to the project number.

There was a growing spot of anger within the Link from a single source and another, better controlled. The rest was bated anticipation.

"Wait a minute, Tony," Martin said, incredulous. "Back up a bit. Is what you *really* said that we have no legal rights?"

THE HEIRS OF JOSEPH PENN

Dates cleared his throat and looked profoundly embarrassed. He had not realized there were still such gaping holes in Martin's indoctrination. "Well," he said in a low voice, "that's pretty much the case."

Martin heard his name, quietly, from an unidentified source and ignored it. There were two equal hot spots of anger now and the heavy weight of a forced calm.

"You're not specifically being discriminated against. Government has simply had no reason to respond to your condition. Laws aren't created or modified by whim. It requires substantial impetus to accomplish something of this nature. Bear in mind that there can't be more than a couple of hundred of you in the entire world. When the need arises I'm sure something will be done."

"A simple act of omission," Martin said sourly.

"Well . . ."

"Shut up, Tony!"

"Jesse, butt out," Martin said, eyeing Dates. He stood near the door and glared through the narrow space between bodies.

The Link was restive. The angers smoldered.

"Martin," Justin said quietly, "I don't think this is the time or place to get into this."

Martin ignored everyone but Dates. "Come on, Tony," he prompted, "tell me how you get to be a second-class citizen in this day and age."

Dates sighed and shook his head slowly, looking down at his blotter. He collected his wits and looked back with a blandly frank expression. It efficiently hid the fact that he was feeling spiteful. "To be perfectly honest, Martin," he said slowly, "you're not citizens."

One of the angers froze, the other flared.

"That's it, Tony!" Jesse snapped, launching himself from the door.

Dates recoiled as the man came at him, arm leveled and pointing. He was not sure if it ended in a fist.

"One more word out of you and your—"

"Jesse! Stop it!" Justin caught his left arm, turning him aside. "Calm down, you're not helping the situation."

"Damn it, I won't have him stomping all over Martin's self-concept!"

"It's common knowledge," Dates said defensively.

Jesse gave him a scalding sideways glare. "I'm warning you, Tony."

"You all know," Martin gasped. "All of you." He could almost match the names to spots within the great body of embarrassment in the Link—Julian's unreadable expression fitted neatly to a tightly bounded area of rigid emotional control and Jesse was a powerful, scorching anger. Martin's own anger rose again.

"There isn't a hell of a lot we can do about it," Jesse was saying through clenched teeth.

"And you," Martin said caustically moving between Justin and the door, making Jesse turn again to look at him. "You who are so concerned with my self-concept—how come you never said anything . . . not even a hint?"

"You weren't ready," he said, pulling loose from Justin.

"What else have you seen fit not to tell me?"

"You're in no position to judge, Martin," Jesse snapped. "You can't understand what it's like. You haven't been one of us long enough."

Martin backed toward the door, his expression icy. "I don't believe you said that," he hissed. "Well, do me a favor . . . brother . . . take your goddamned benevolence and stuff it!"

He flung the door open, narrowly missing Joel but what he flung at Jesse did not miss. The load of pure venom Martin discharged across the Link was aimed directly at him. There was a general gasp but Jesse, a moan in his throat, reeled back hard against Justin, who barely kept him from falling. He could not catch his breath at first. By the time he recovered, Martin had vanished from the outer office.

"Martin!"

Julian stopped him at the door. "Leave him alone, Jess."

"I didn't mean it, not like that—"



"I know. He knows, too, but he's not thinking. You weren't, either. I'll talk to him."

"No! I have to do it."

"You're too upset."

"I can do it! . . ." Jesse realized he was shouting and took a firm hold of his self-control along with a deep breath. He forced calm upon his face and beat down the anger. "I'm all right. I have to do this, Julian."

He was right. Julian took his hand from Jesse's shoulder and watched him race off. He sighed heavily as he leaned in the doorway. Martin's anguish, fury, and confusion were clear and present. But also clearly in his mind was what Martin had done. It was powerful and undisguised, both in intent and aim. The frightening part was Martin's ability to single out one individual to bear the brunt of the attack. They had never experienced anything like it before. He did not believe Martin realized what he had done.

Justin was sitting on the corner of the desk tracing little squares on the blotter with a pencil. That always annoyed Tony. His manner was calm but chilly. "Why didn't you tell us about this, Tony?"

"I didn't think it was important."

"Are you serious?"

"Look, fellas, it's my job to field this kind of stuff. Legal says at worst it's a nuisance. No one on this project team will ever see the inside of a court room. You have more important things to do. It wasn't a problem."

Justin tossed the pencil on the desk and looked at Dates with cool frankness. "Well, it's a problem now."

FOR THE NEXT TWO DAYS the Link was profoundly unsettled. In the early days of Martin's reintegration they had noted that he did not seem to realize the weight of his presence within the collective awareness. He displayed a certain insensitivity when in an extreme state of mind which suggested he had at some point in his life learned to partially block input. It was generally agreed that Jesse and Julian should sit him down over the weekend and hash the situation out since he was not achieving any measure of successful reconciliation on his own.

Martin had to admit Jesse was right. He was not ready to know, but more than that he resented the *fact*. And he resented the others' acceptance of it.

Friday night Jesse collected Martin after work and invited himself for dinner. Julian was stuck in a meeting so they settled down to wait with a deck of cards. No one cooked for Julian. He was a fanatic about his kitchen and cooking was his chief means of clearing the mind of a day's business. He did it magnificently. It was another reason Martin lived with him.

Martin noticed the itching little nervousness creeping across the Link before Jesse did. It wasn't alarming but there was something distinctive about it. Jesse was more alert to Martin's distraction than to what was in the Link, until the fear welled up. It filled the Link, obliterating all individual awarenesses. Martin's sensitivity to the moment was a bit more acute than Jesse's, his reaction a split second quicker. There was pain in the fear which blossomed into pure agony with each heart beat. Jesse and Martin stared at each other, wide-eyed and helpless across the coffee table.

"It's Julian," Martin gasped. "I know it."

Then everything broke apart. Martin was not sure if he actually screamed aloud but he bolted from the couch an instant before Jesse found his feet. Jesse had him by the shoulders, arresting his flight to nowhere. All they could do was share their desperation and search the Link. It was storming with a common panic but at what seemed to be its center there was a spectacular dullness, an inkblot against a vivid pattern of colors: still, insensitive, more frightening in its implications than the terror.

"What's happening?" Martin's voice choked in his throat.

Jesse could only shake his head and look desperate.

The dullness began to stir and there was pain again and a great sense of need which grew as the fear had grown till it was as unbearable.

The doorbell rang from the foyer.

"Oh my God!"

Martin tore himself away from Jesse. The elevator was slow and Martin did not wait. Jesse was half a flight behind as they fled down the stairs. Nearly unhinging the inner door of the foyer, Martin found Julian on the floor below the mail boxes pitched forward in a fetal crouch, his face against the tiled wall. There was blood everywhere. He knelt behind his brother and gently put his arms around him, lifting him back from the wall. Julian's head rested on Martin's shoulder. Jesse paled and turned away, fighting to control his stomach but he couldn't suppress the sickening, gut-twisting wrench that escaped into the Link.

The amount of blood in the corner by the boxes was horrifying and Julian's body felt frighteningly cold in Martin's arms. "Help me, Jesse," he whispered.

They laid him on the floor as carefully as the tiny space would allow. It was an old building, with an outer door and a locked inner one and barely enough room between for the

three of them. Julian gasped, eyes crushed shut, and made wounded animal noises in his pain. His face bore ghastly signs of damage. It was laid open in several places including a wide, ragged wound about the left eye which was obscured by blood and swelling. The rest was bruised, bleeding and oddly lumpy. Breathing was difficult and made rattling sounds in his throat. The day had been warm and he was not heavily dressed, no extra insulation between his body and the assault. He lay on the floor shaking violently. Martin had felt broken bones.

They knelt on either side of him, Jesse holding his right hand, leaning close making quieting noises. Julian tried to force intelligibility into the sounds in his throat with a pitiful lack of success. They felt his stabbing need to communicate something. He did not know where he was or who was with him. He made a terrific effort and tried again.

Martin.

They weren't sure if they heard it or felt it. The next time the whisper was audible.

"I'm here," Martin said. Julian's eyes were open but he did not seem to see them clearly. "Here," Martin said, brushing the hair back from Julian's face; dark asburn, blood red. "I'm all right. So is Jesse."

Jesse pressed Julian's hand gently and his relief touched them like a sigh. He tried to say something but it was not coherent. Martin clutched the corner of his jacket and fought tears. All Julian's confusion and pain ached within him, burning in his throat with an overwhelming need to cry. It immobilized him, shutting out everything else. He could not even spare Julian the grief.

Jesse shook him.

"Snap out of it, Martin, we haven't got time for this. Call an ambulance. Hurry up, get going."

Martin fled the foyer without a word. There was an elevator in the lobby. Jesse settled down closer to Julian and sighed. Martin was not much good in a crisis and it promised to get worse. His apparent ability to disengage himself from the group and concentrate on a single brother could prove disastrous. The question was for whom.

Julian stirred beside him and said Martin's name again.

"He's getting help," Jesse said. "Just stay quiet, we won't leave you."

"Jesse, I'm scared," Julian said. His voice was thick and faint but intelligible.

"So am I." There was no point in lying to him. He knew, Jesse could feel Martin's frantic pursuit of his task and wished he could control himself better. The thought was bitterly amusing for a moment. He was usually the last person to be able to claim that skill.

"Why?" Julian murmured through a moan.

"I don't know."

"Behind me, outside the door... bigger... heavier. Hit me. I think he broke my ribs. I got in but I couldn't... hit me in the face. I could see his hands... Just his hands..."

"Not now," Jesse soothed. "Be still. You'll be all right." He was not sure he believed that, but just then, more than anything else, he needed to. If it was a lie, Julian did not know. He slid into deep, black unawareness and for a moment Jesse felt terribly lonely. He also felt Martin panic upstairs.

Grabbing the quilt off his bed Martin raced back to the lobby ignoring the telephone. The ambulance was on its way and so was George Willis. Martin had gotten him at the clinic. He would probably get there before the ambulance. Careening around the last bend in the stairs he nearly sent his

landlady over the banister.

"Mr. Penn!" she gasped. "What on earth is going on?"

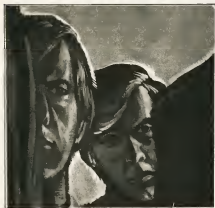
Martin stopped in front of her and held her back with his hands on her elbows. Even a step down he was taller than she, a tiny grandmother of a woman who was proud that her tenants called her house their home. She liked the Penns, though she never could tell the two apart. The face on the young man was all she needed to sense tragedy. The brother was her first thought.

"It's Julian," Martin confirmed. "Someone caught him in the foyer and . . . beat him. The ambulance is coming.

She looked at him closely and realized that there was blood on the bright pattern of his shirt. She gasped and hung back and Martin raced to the foyer dragging the quilt. As he entered another man stood up. That was strange, she could have sworn it was Julian, but how could that be? The figures ducked and turned and disappeared a moment, doing something with the quilt, then Martin in the bright shirt was standing again looking out the front door. She crept to the foot of the stairs but went no closer. There had been too much blood on that shirt.

When the ambulance arrived the foyer became very full and overflowed into the lobby. There were indeed two Penns. Had he really said Julian? He was very upset. Maybe he was Julian. There was a third man. He plumply blocked the view through the door as he herded the younger men away from the activity outside. He was middle-aged and patronly but he did not look like their father. She came forward and asked if she might help. Martin, abstracted and distraught, declined, thanked her and kept looking back through the door. Jesse and George Willis introduced themselves.

Triplets, she thought, who would have guessed?



There was commotion outside and another man pushed into the hall. Martin and Jesse crowded past him and followed the stretcher to the ambulance. The man in the hall was rolling down his sleeves when George Willis *humped* and caught his eye. He finished putting on his jacket and took a deep breath.

"Somebody did a masterly job," he said with odd detachment. "Looks to me like he did the whole thing with his bare hands."

"Fred," George scowled, "did I ever tell you you can be

revolting? I didn't drag you over here to turn my stomach beyond necessity. Just tell me how it is."

"He's got a lot of broken bones; I didn't take a count. The left hand is crushed, the nose and the left malar are smashed, facial lesions are pretty deep, massive contusions on the upper body, seems to have taken a blow to the throat, I'm not sure about the internal injury but he was starting to cough blood just before they packed him up."

"Damn."

"His face is going to need a lot of cosmetic work if he ever expects to look like his brothers again."

"Hell of a time to think of that," George said.

"We'll have to rebuild the entire left cheek as it is. May as well do the job right the first time."

"Am I to infer that, since you are so concerned about aesthetics, you're not worried about his life?"

"No." His manner had altered subtly. "He may not even make it to the hospital. His body is wrecked, George. Masterly was the wrong word, try thorough. I've had my share of fires, auto victims, that crash out at La Guardia a couple of years ago, and deliberate, vicious beatings like this are right in there with the most revolting things I have ever seen. Forgive me if I don't seem very compassionate but I have to work on that body tonight after Daniels is done. Without my detachment I think I could easily be sick to my stomach."

"Fly your trade, George, those brothers have an ordeal ahead of them. Even if he pulls through that doesn't mean he's out of the woods. I'm concerned about his eyesight, particularly on the left."

George noticed the landlady hovering near. She looked profoundly sad, genuinely concerned. "That poor boy," she said. "They're both so nice. I just don't understand." Then she shoed them out of the hall. "Tell them not to worry about the mess," she said earnestly. "I'll take care of everything."

The ambulance was gone and George asked Fred to wait at the car; he'd be there in a minute with Martin and Jesse. They stood by the curb where the ambulance had been. George caught only the last shred of a sentence. He wasn't sure which one had uttered the threat.

"... I'll kill him!" Martin said fists balled tight.

"Kill who?" George said sternly.

"Nobody," Jesse cut in.

George looked them over in the street light. Both faces were set but the eyes smoldered in one, and were hard and stubborn in the other. He singled out the first speaker. He thought it was Martin but the demeanor made it difficult to tell, he and Jesse could be so alike at times. "Have you called the police?"

"No."

"When we get to the hospital, then. If you think you know who did it, Martin . . ."

"I'm sure."

"No you're not," Jesse said flatly.

"Tell the police," George said.

"What good would that do?" Martin growled bitterly.

Jesse quietly thanked George and said they would meet him at the hospital. George had never seen Jesse so controlled. He nodded and left, offering to make the call.

"Martin, you can't prove a damn thing," Jesse snapped when George was away. "Julian didn't see him. Sure, it could be Penn. Or it could be someone he hired, or a plain old mugging. Give it to the cops for chrissake."

"And have them do what with it? Treat it like a vandalism?"

Jesse's open-handed blow burned across Martin's face and sent him crashing among the rubbish cans at the curb. Though he felt it coming, the motion and the anger were so integrally bound he had time to do nothing but realize. Jesse crouched over him, the flat of his hand hard against Martin's chest. He had never hit a brother before. He had never hit anyone, and it felt lousy but he was adamant.

"Another me we don't need. If I can keep my head for Julian's sake, so can you. If you can't, get it out now while he can't be hurt. Just you and me, Martin, right here, right now."

Hate, anger, and resentment resolved into the purest despair. Martin sat up, covering his face, his body shaking with the tears.

"What am I going to do, Jess? God, I love him. What'll I do if he dies?"

Jesse knelt by him, held him, and did not know what to say. Martin clung tightly to his brother, purging his grief with heavy sobs that were a solid pain in his chest. Jesse's own pain burned, consumed the control he had been fighting for since the horror began. The tears came hot and quiet against Martin's hair.

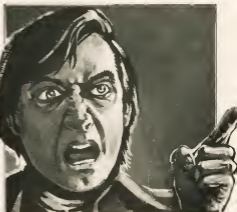
MARTIN SAT BY A HIGH BED in the dim light, forehead pressed against the raised rail, holding Julian's right hand. It was five a.m. The doctors had finally relented and let him into the room after exacting half a hundred promises of various kinds. There was a nurse, too, who sat over by the banks of incomprehensible machines, mute and unobtrusive. Julian looked like a mummy, the hand Martin held being one of the few parts of his body relatively unswathed. In the room and at the desk in the hall every life sign but the Link was monitored and recorded. Martin was monitoring that. The anesthetic was dissipating. He could tell by the texture of that awful blackness.

The police had been there when Martin and Jesse arrived. There were no familiar faces in sight. Jesse pushed Martin to a phone where he called Justin while Jesse talked to the cops. There were a million questions, many of them unanswerable. Martin stood by most of the time, glowering silently as Jesse acquainted the officers with their suspicions about Joe Penn and the reason for them. For a man determined to win, fear was a powerful ally. When the word clone came up the brothers had not missed the instantaneous suspension of belief, though it could be detected only in subtle changes of facial expression. One of the officers began making extraneous notes. Then Joel arrived and Martin turned away to give his brother a quick synopsis. Twenty minutes later the emergency waiting room contained seven identical men with identical miseries on identical faces. The police left disturbed, baffled but no longer unbelieving.

George Willis materialized from somewhere. All he could say was that Julian was in surgery, there was nothing they could do but he did not really expect them to go home. Tony Dates had come bustling in but did not stay long. Wednesday was too much in his mind as he watched Martin and Jesse forcibly maintaining their composure. To George and Dave Norton, who came and stayed most of the night, Tony was peremptory and abrupt. He tended to be that way with anyone the clone jointly regarded a friend.

Throughout the night they possessed the waiting room, sharing whatever comfort they could muster for themselves, a

common sorrow and a fear. It was Joshua who finally voiced the question for which there was no answer. What if Julian were to die? Linked as they were, what would happen to the rest of them? Of the Linked sets to emerge from the projects all were still alive. There was only one among them who seemed not to fear the idea of being traumatized into vegetation. But when the doctor came in there was instant and alert anticipation on all fronts. He had nothing much to say except that Julian had survived surgery, as if it were a thing they needed to be told.



George and Dave argued that for them to stay was a waste of energy. If Julian needed their support, they owed it to him to be in a condition to give it. They agreed and a minute was devoted to scheduling who would be there when. Jonathan was excluded under protest. Always peculiarly sensitive to stress within the Link, he was not bearing up well. George gave him a sedative to deaden the Link awareness and sent him home in a cab.

Martin stubbornly refused to leave.

Dave insisted.

Martin got surly.

The psychiatrist did not press. He was tired, Dave knew, and eventually, no matter how he ignored it, nature would have her way. Jesse stayed, too, but more to keep an eye on Martin than from any hope of what he might do for Julian. When they were allowed into the room he had not remained long. It was no help to see his brother like that. Martin had not even heard him leave. Jesse walked home.

From time to time there had been fireflies in the night. They had all been aware but Martin did not think of the others. They were tiny shots of...something. It had alerted him to the waning of the anesthetic. But there was nothing now, only a deep, frigid emptiness where nothing reached, nothing moved. He began to search that terrible shadow which hid his brother from the familiar spot in his mind. There was life beneath it; Julian was alive, but he was lost. Martin wanted to reach out and touch him, hold him as Jesse had done in their mutual grief, anchor him through the Link to his brothers. If he could penetrate the darkness he could show the others. If they all held him, unified as he knew they could be, he was sure Julian would not be able to slip away.

THE HEIRS OF JOSEPH PENN

He strained his awareness, shut out all distractions, plumbed an unbelievable depth, searching. There was only emptiness—magnetic, compelling. No fireflies.

At the edge of the park Jesse felt Martin. He was sure, and it cut him cold in his tracks. Jonathan was a soft, fuzzy nest of sedation and had been for over an hour. Only Martin would dare. Only Martin, who loved Julian so openly, so blatantly, who would follow him to the ends of the earth, would not hesitate to seek him within the blackness. But when he reached what he sought it would be so close to death that, were Julian to die, it could well be the end of Martin, too. It was chilling to realize he would willingly follow Julian into death. Jesse's own anxiety gained company from several sources as he turned back from the park. He tried to muster all the support he could find and push the intensity. One casualty was already too many. He could not allow Martin to persist in this madness. Martin, however, was ignoring everything but his goal.

The hospital was too far. As Jesse raced back up the block he knew it was already too late.

Martin had a headache. He was only slowly beginning to feel his body. He lay in limbo for a long time, refusing to open his eyes. It was too much trouble. It hurt to think. Something seemed to tickle him but he could not figure out where he had been touched. In his mind there was a great quiet. Not an absence, just quiet.

Tickle.

He opened his eyes slowly. White. Ceiling? He turned his head. White wall. White? He did not know where he was.

A gentle voice said, "Hey, dummy, I'm over here."

Martin turned to Jesse sitting by his bed leaning on a half-raised rail. Martin began to realize.

"Welcome back to the real world, though I must say the last three days have been blissfully quiet without you. By the way, I have a message from the assembled multitude, quote, 'Don't ever do that again!' " The last was delivered with absolute seriousness. "We damn near lost you both for a while."

Martin sprang bolt upright. "Julian!" he gasped, and began a frantic search of the Link. The blackness was gone but he could not be sure...

"Leave him alone," Jesse said sitting back, looking tired. "He's OK."

Martin rubbed his legs and rested his aching head on his knees, relief rushing through him with the blood in his veins.

"I'm sorry, Martin, that's a bit of an exaggeration, I'm afraid. He's alive, he's conscious, he's been off the critical list for over 24 hours, they don't think his vision will be impaired, but he's going to have to face more surgery tomorrow and he won't be out of here for a long time."

"But he's going to live," Martin said firmly.

"Surgery is always a risk. No one here makes any promises, but things are looking up. Now all we have to worry about is keeping a rein on you. You have to control yourself. He can't take the strain. Be good to him."

"I'll do my best," Martin said. "I promise."

"Good," Jesse said with an odd smile. "Then you can see this." He flopped a folded copy of the morning paper at Martin's feet.

Martin stared over his knees at the front page, then snatched it, an epithet lost in the crackle of paper. His anger snapped and he looked at Jesse as he tried to contain it. "I'm trying, Jesse, I really am," he gritted. "What the hell is

M. Lucie Chin

this?"

At the top of the front page was a photograph of Justin (he'd know that overcoat anywhere) outside the CRDP building. It was repeated seven times in a double row across the page. The eighth frame at the right end of the lower row was the same shot of Justin, but it had been disgustingly mangled before printing. Martin didn't bother to look at the headline. "Shit!" he said under his breath.

"They must have picked it up from the cops," Jesse said. "But it doesn't really matter. This could be one of the best things that's ever happened to us."

"Are you kidding?"

"Listen, I talked to legal this morning. That nuisance suit is actually going to court; they got a date yesterday. We can make use of this. They talked to the people in a position to know the subject, which is all to our advantage: George, Dave, Tony, half the CRDP overlords—they even found Loren Johnson."

"How'd they miss ol' Joe Junior?" Martin grumbled.

"Oh, they didn't miss him," Jesse reached for the paper and flopped it flat on the bed. In the lower right corner was another pair of photographs about two short columns of text. Martin studied the two pictures. That same photo of Justin, enlarged to head and shoulders—youth, handsome, quietly pleasant; Joe Penn's surly middle-aged beefiness suffered by comparison. Nonetheless the physical resemblance was strikingly apparent.

"There's a lot of food for thought in there," Jesse said, recapturing the paper.

"Maybe," Martin said still skeptical. "But the value of that escapes me. There have been articles on cloning before."

"True—true, but this stuff isn't about cloning, it's about clones. One in particular, if we can manipulate this thing right. Don't get all hot under the collar. Justin and I talked to Julian already. He agrees this could be a godsend. What do you think moves governments, Martin?"

"Publicity?" Martin said sarcastically.

"Public opinion. How do you feel about being a *cause celebre*? There's enough emotional impact in this to shake the nation, and once we've shaken them they can do some shaking of their own. There is more at stake here than a law suit. We don't express it very often, maybe we don't even feel it, but there is a larger brotherhood than just we eight. One hundred seventy-seven of us to be precise—mostly men, a few women, some still children—just like you and me and Julian. There are eleven sets, fifty-nine individuals in this country alone. Nothing will happen for us unless we endeavor to make it happen for them too. We've got a chance now, we've got a tool, but we have to use it. As for Joe Penn... we don't know if he had anything to do with what happened to Julian. We may never know. But, no matter what, he is against us. One way or another, sooner or later, he'll get what's coming to him. It won't be by your hand, or mine, but it will happen. It's inevitable."

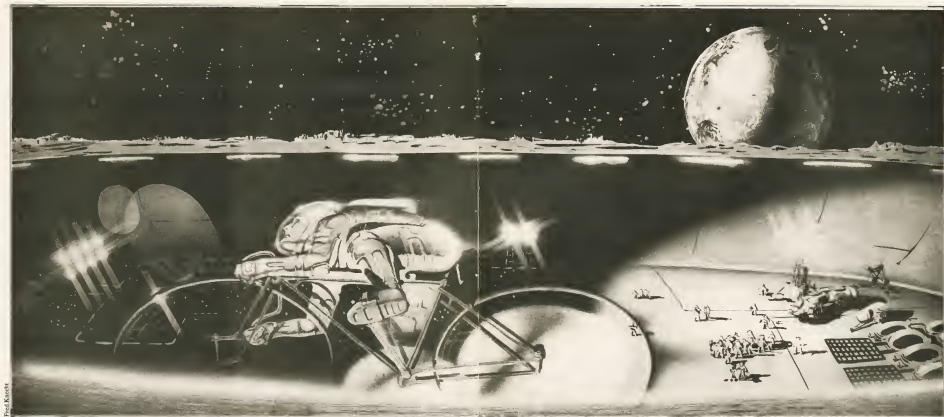
"Tell me, did you and Justin think this up all by yourselves?"

Jesse shrugged. "Not exactly."

Martin chuckled and shook his head. "Good old Julian, practical to the core."

"Like I said, we don't need any more like me, but I'll take six of him any day." Jesse grinned broadly, getting to his feet. There was a great warmth growing within the Link. "Come on, get dressed, I'll take you to see Julian."

—G—



Frank Knecht

CALLING SHAPES AND BECKONING SHADOWS

Eugene Potter

THERE'S A REPORTER OUT THERE," said Assenmacher sullenly.

"Have somebody send him in," said Whitney to the mechanic. "We have a little time, don't we?"

"You have the biggest race of your life coming up in about twenty minutes," said Assenmacher. "You don't have time—we don't have time for reporters."

Whitney signaled to the attendant by the dressing room door anyway. "We always have time for reporters," he said.

"Hmph," said Assenmacher, turning away to pick deftly through an assortment of tools on the counter.

"People want to know about us," said Whitney to Assenmacher's back. "If people didn't care about it, I don't imagine I'd be riding this race at all. My father used to tell me that a man can't do anything apart from other men. I really believe that."

Assenmacher made no reply, but continued his tool sorting.

Whitney stretched uncomfortably in the skin-tight pressure suit as the attendant opened the dressing room door to let the reporter in. The pressure suit was a lot less comfortable than it would be if he were outside in the vacuum, but he was

hoping a conversation with a reporter might keep his mind off the black hole he could feel in the center of his stomach.

The reporter appeared and loped toward Whitney in the peculiar locomotion of the moonbound.

"Thank you for your time, Mr. Whitney," he said, seeming more or less at home in his helmetless space suit. He pulled a cassette recorder from a pouch in the front of the suit.

"Happy to do it," said Whitney, and smiled. Assenmacher ignored the reporter, occupying himself with fidgeting the racer's air tanks.

"What do you think are your chances," began the reporter. "of making your record today?"

"I'll do it," said Whitney with a confidence he did not feel. "I wouldn't be trying it today if I didn't think I could do it." He felt himself pushed and pulled by Assenmacher's unfriendly strap adjustments.

"Do you think you will exceed the MERCKX point by the same kind of margin you made in 1989?"

Whitney shrugged against the air tanks and Assenmacher tightened another fitting. "I know I'll beat the MERCKX," he said, "but this is a lot different from Mexico City. The

distance margin is bound to be greater, of course."

"What is the MERCKX point for this race?"

Assenmacher step-glided from behind Whitney and handed the man a sheet of paper. "Here," he said. "It's on this press release. Didn't you get one of these?"

The reporter took the paper and ignored the mechanic's hostility. He looked at the sheet. "I see," he said. "How far do you think you can go past 723.087 kilometers?"

Whitney smiled again. "If I ride 723.088," he said, "I would be happy."

Assenmacher stirred restlessly and Whitney put a hand on his pressure-suited arm to calm him.

"It's almost time to suit up," said the mechanic.

"Just one more question, then," said the reporter.

Whitney smiled theatrically.

"There has been a lot of study recently," said the reporter, "about just what it is that enables an athlete to exceed his own best performance as predicted by the MERCKX program. Do you have any ideas on the subject?"

"The MERCKX program seems new," said Whitney, "but it isn't. The athlete has always competed against an ideal. The MERCKX simply takes that ideal out of his head and puts it in a computer where other people can see it. Beyond that, I'll leave those questions to the experts."

Assenmacher slowly stepped between Whitney and the reporter, holding a lucite bubble in his hands. "It's time to finish suiting up," he said.

"The people of the moon want to know," said the reporter, trying to dodge around Assenmacher to address Whitney, "if you intend to continue racing after this?"

Whitney smiled. Assenmacher had lowered the bubble over his head and was fastening the neck seal and connecting air hoses. "As long as the people care," he said, but his voice merely rang in the bubble and he doubted the reporter heard him.

One of the attendants was leading the reporter out of the dressing room and Whitney again became aware of the vortex inside himself. The panic was reaching for him, threatening to suck him downward. He felt a touch on his arm and gratefully smiled at Assenmacher.

The mechanic did not attempt to speak to Whitney, but gently grasped his arm and steered him toward the private airlock. Over the past month of working out on the track in total vacuum, they had evolved a sort of silent communication and they talked a lot less than they had on earth.

Whitney entered the chamber and turned around. Assenmacher was loping back toward the rack for his own helmet as the attendant pushed the airtight door closed.

The racer tried to get his mind off the fear while he waited for the lock to cycle, but all he could think about was the number of people who would be watching him today. The thought threatened to make him even more fearful, but the green signal appeared on the lock's control panel, so he occupied himself with turning around and pushing open the outside door. He walked carefully out on to the pavement, stepping lightly with the cleats on the bottoms of his shoes. The track was lit with floodlights and there were hundreds of spectators standing around in conventional pressure suits. He thought he might never get used to the silence. He could hear his own breathing, but nothing more. There were hundreds of people here talking and doing things (they might even have cheered him when he appeared), but he was completely isolated from them.

He peered into the inky sky beyond the floodlights. It was

earthrise and the exquisite blue and white world hung there in three-quarter phase like some outlandish decoration. It took a conscious effort to find any significance in his achievement of being the fastest bicyclist on that planet when he viewed it from here. But he made the effort and brought his mind back to the modified solar collector which would serve as a track for the fastest bike ride in the universe.

His bicycle was leaning against a console and he walked over to it to examine the tires. It wasn't really necessary to examine the solid polymer, he just couldn't break the habit he had developed in years of racing on earth.

He thought for a second about what had brought him here. The business of record-setting had established itself as an obsession by a humanity hungry for heroes and hungry for confirmation of the incalculability of human effort. Such was the drive behind the American lunar colony's invitation to him for a time trial on the moon. As soon as it became clear that disarmament talks with the Soviets required a suspension of work on the five-kilometer solar collector, the citizens had pooled their resources to modify the finished foundation and turn it into a bicycle track. Then they invited the world record holder for "the Hour" to ride on it.

In the old days, he would have had an easy job. He would be the first man to ride the Hour on the moon and just completing the event ought to logically make him the record holder. Things were not so simple in 1992, however. They had run MERCKX on him and the computer had predicted his performance almost to the meter. By the rules of international competition, there would be no record unless he exceeded the computer's prediction. He wasn't racing against the clock the way they used to in the old days. He was racing against an ideal model of himself housed in the banks of the lunar colony computer.

Here he was, then, completely encased in a skin-tight pressure suit, a lucite bubble on his head, compressed air tanks on his back, doing a pre-race check on a funny-looking bicycle in a total vacuum. The machine had spoked wheels one hundred and fifteen centimeters in diameter. The tires were one-centimeter bands of solid treated polymer and the whole drive train was virtually frictionless plastic, of the type used on frying pan surfaces. What would his father have said about this? He shook his head and smiled to himself.

Somebody approached him wearing a conventional pressure suit and he recognized Assenmacher's concerned expression through the face plate. The mechanic pantomimed questions to him about the bike. Whitney realized Assenmacher had seen him shake his head and was worried his rider had uncovered a mechanical problem. The face in the little window mouthed the questions involuntarily as the man acted them out, reflecting the depth of Assenmacher's concern.

Seeing him talk with no sound this way, Whitney felt a pang of loneliness and wondered if he should not have accepted the proffered donation of a small radio receiver from that electronics firm. No, the damned thing would have merely been a distraction. He could live without hearing people for an hour. It was only an hour, after all. That was the whole point of the race, to see how far he could go in an hour.

He smiled with a confidence he did not feel and signaled Assenmacher not to worry. The mechanic's face resumed a more cheerful expression. He reached toward Whitney, grasped the racer's hand in a large glove, and smiled. Whitney felt the black hole down inside himself again and fought to keep control. He knew he couldn't meet the

MERCKX prediction and he knew all of humanity was watching him. He wished his father were there.

Assenmacher gently pushed Whitney away from the bicycle so he could walk it over to the starting line.

Whitney followed him toward the level portion of the track. The crowd of anonymous pressure suits parting for him. He felt the touch of gloved hands on his shoulders occasionally as he walked among the spectators and he tried to smile at their dark face plates.

Assenmacher was holding the bike upright at the starting

(and almost as reliably) as the battery of timers, sensors, and electric eyes housed under the enormous makeshift track.

THERE WAS NO DOUBT IN HIS MIND how this race would come out. He would fail. He knew that from the minute he received the invitation to do it, as surely as he knew he had to accept the invitation. He had been virtually paralyzed with fear when Assenmacher had showed him the message from the lunar colonials. Then he'd spent the rest of the day by his father's grave—not



line and the attendant was placing the small footstool next to it, so Whitney would be able to straddle the high machine. The attendant bounded away and Whitney put a hand on his mechanic's shoulder as he carefully mounted the short steps. No sense in coming nearly 400,000 kilometers to trip over his bicycle and break his neck. Of course, the fall wouldn't hurt very much in one-sixth gee and was quite unlikely to break his neck. There was a fair-sized crowd, however (not to mention television cameras), and he didn't want to look silly.

He straddled the bike and settled lightly on to the saddle while Assenmacher held the machine upright. He slipped his right foot into the toeclip and reached down with a supple glove to cinch the strap tightly. He felt the side plate of the pedal pop into the female cleat on the bottom of his shoe and pulled the strap tighter. With Assenmacher still holding the bicycle firmly, he reached down slowly and repeated the fastening process with his left foot.

He leaned over and grasped the bars. With no air resistance, it was theoretically unnecessary for him to ride down on the drops, but he had ridden that way on earth for so long he could not ride any other way. He turned and smiled at Assenmacher to let him know he was ready. Assenmacher didn't move, but Whitney knew he was relaying the message over his pressure suit radio. It would be a minute or so while the electronic timer counted down.

Whitney reached over and set the time and lap counter mounted at the center of his handlebar. The digital display glowed and darkened again, showing it would start automatically when the bike moved. He was glad he had the counter. It would enable him to monitor his performance and pace himself. He would know the results of the race as soon

looking for guidance (he was a little too grown up to look for guidance from a mound of dirt), but trying to deal with the fear.

He looked around the familiar track in an effort to calm himself. He had been working out here for a month now and felt at home with his surroundings. The enormous dish of the solar collector was about five kilometers by one-half kilometer and either end of it was inaccessibly remote, even if barely visible. The track architects had overlaid the dish with an oval lap precisely ten kilometers in circumference. The track surface, like everything else man had built on the surface of the moon, was made of pulverized bonded stone (reasonably easy to spray into place and drying instantly). The track was banked much more steeply than the collector, having been built up by repeated spraying of stone.

There was a fair-sized pressure-suited crowd in the center of the track. At least it was fair-sized by lunar standards. Comprising a few hundred individuals, it must have been a substantial portion of the moon's population. You would get a much larger crowd on earth to see a man like Whitney, but this wasn't earth. The representation was international, however, as attested by the presence of an isolated group with red stars on their helmets. The Soviets had probably been invited as a gesture of goodwill and a reiteration of the American colony's peaceful goals with its collector.

On earth, the spectators would have sat in stands around the track rather than in the center. But on earth the track would only have been a tenth as large, and on earth the track would not have been so steeply banked as to actually turn back on itself (a measure adopted to keep the seven-hundred-kilometer-per-hour cyclist from flying out of the track

altogether).

He thought about the track at Mexico City. He had been six years old when Eddy Merckx set the last of the old-fashioned cycling records there in 1972. God, it had been exciting. Thousands of people around the track, shouting, screaming, roaring, and knowing that Merckx would smash the record to pieces. Whitney's father had used all his influence as a bicycle manufacturer to get them seats close to the edge of the track, and the little boy had imagined he could hear a resonant buzzing over the deafening crowd noise every time Eddy's orange bicycle zipped past at better than 49 kilometers per hour. The man was out there pushing himself as far as he could go, and Whitney and his father screamed themselves hoarse for him. His father had told him, as a matter of fact, that they were largely responsible for Eddy's success. A cyclist does his best, he had said only half in jest, when the crowd works for him.

His own hour record in 1989 on the same track in Mexico City had been a lot like that. The crowd noise had been deafening. And as he'd neared the end of his hour they had been so excited about his beating the computer that they



began to chant him. *WHITNEY WHITNEY WHITNEY*. It had set his cadence and he had made his record with it. He rode one more lap at the end of the hour. Spectators threw flowers on him and he smiled until his face hurt, convinced he would have failed without the help of the crowd.

His father, apparently living up to his belief about the crowd working for the cyclist, had screamed himself to death. He'd had a massive coronary occlusion, brought on (according to the Mexican physician) by intense excitement. It had felt strange to come down from the highest pinnacle of his life to

the news of his father's death. He had not raced again afterward. Not until this invitation. How could he turn down a request to take humanity's dream to another world?

He saw the ready light had changed from red to yellow and he knew it was just seconds now. He stood up slightly on the pedals and leaned as far forward as he could to keep the front wheel down when he jumped from the line. The light turned green and he exploded into motion, stepping down for all he was worth with his right foot, feeling the reaction in his left foot as the direct drive pushed it to the top of the pedal arc. He settled back down on the saddle and pushed himself into his old rhythm, knowing he was doing 120 rpm.

On this machine, a cadence—a pedal rhythm—of 120 rpm was bound to take him 723.89 kilometers in one hour. It would give him his MERCKX point and then some. He knew the computer prediction was based on his inability to keep this cadence for one hour. The fear wasn't so immediate now, but it was there just the same—a brooding presence.

He moved out toward the center of the track, allowing its steep bank to bring him and his bike virtually parallel to the paved lunar surface at the center of the oval. He had ridden on this track scores of times while preparing for the competition, but a decade of earthbound racing was enough to make this an awesome delight no matter how many times he did it. There was no wind in his face. He knew he would have to pace his effort to make up for the lack of convection cooling. But it was hard to limit himself. He had the muscles of a seventy-kilogram athlete and the weight of a twelve-kilogram one. The effort which would yield a speed of forty to fifty kilometers per hour on earth moved him at speeds over seven hundred kilometers per hour here. If he had not conditioned himself to it over the past month, it would have been dizzying. Even so, he could risk looking at nothing but his timer and the track surface, knowing that the stark scenery of the lunar racecourse would be a mere blur. The wonder of it was as intoxicating as ever and for a moment he forgot the fear. The machine moved like a rocket.

How far they had come since the days of Eddy Merckx! "Fast Eddy" hadn't realized that even while he was smashing a record in Mexico City, there was a computer research group attempting to determine the performance limits of the world's finest athlete on any given bicycle under any given conditions. It mattered little that he had broken the record before they were finished constructing their model (which they naturally named after him). In fact, it would lend credibility to the study if it predicted his performance in Mexico City after the fact.

The study was not fanciful. It was at least as sophisticated as most of the operations used by government think tanks to analyze defense capabilities and predict social movements. It included every possible variable, from the well-documented length of Eddy's femur to the friction coefficient of silk tires on varnished wood (oak, not pine). No, it was the best program human beings could devise to predict the performance of an athlete. And it was wrong. The model predicted Eddy would ride 49.405 kilometers in an hour. He actually rode 49.408. After ten years of checking, debugging, and adding refinements (all of which confirmed the impossibility of Eddy's exceeding the calculated prediction), they released the results to a world ready for miracles. And it did indeed appear to be confirmation of the age-old hope that man is something more than a finite number of mechanical processes. Man—and Eddy Merckx in particular—was not a machine, and the scope of his finest

effort exceeded the sum of its parts. Whitney, of course, knew that it had been the shouting of himself and his father which helped Eddy Merckx beat the computer.

It was becoming difficult for Whitney to breathe, a familiar sign. He knew it was a temporary effect and he took it to mean he was meeting his best effort. He sucked air consciously into his starved lungs and checked the elapsed time. Nine and a half minutes, 11.3 laps. He was behind. He must have lost his cadence some time. The fear was back. He would have to be at 11.4 laps to beat the model. He sucked air into his lungs and concentrated on his cadence. The black hole in his stomach was trying to collapse him from the inside. He stared at the timer and tried to think if he could recoup the loss. He would have to increase his cadence at some point to get the distance he needed. Then a sprint at the end would give him his margin.

He could not understand it. Except for the fear, he felt perfect. He was doing his best, and yet he wasn't even doing as well as the computer said he could. He didn't even know why he was afraid. God, it was so strange being out here moving at seven hundred kilometers per hour with no sounds but his own ragged, gasping breath. He was virtually parallel to the ground as he rode at the middle of the track's bank and the corner of his eye showed him a pulpy grey mass where he knew there was a conglomerate of pressure-suited people and television cameras. He felt a strain in his neck and shoulders. He knew it was tension.

Keep the cadence. Watch the timer.

At fifteen minutes, he just turned 18 laps. Concentration had kept him from losing any more ground, but he was still behind. He thought about the cyclist inside the computer, who rode so perfectly without fear. They would cheer him if he could beat that phantom cyclist. He couldn't do it.

Keep the cadence. Watch the timer.

He tried to think of nothing. He tried to lose himself in the pain of the effort. But the pain reminded him of the fear and the fear nagged at his mind. He wheezed and gasped and told himself he would be glad when it was over.

Twenty-one and a half minutes and he was only at 25.6 laps. He should have been at 25.9. He was going to lose. He was afraid he might cry. He had to concentrate. He had to keep the fear at bay.

Keep the cadence. Watch the timer.

To his left side there was a wall where the side of the track disabled over. And beyond that and the floodlights, there was blackness. He could not risk turning his head at this speed, but he knew there were thousands of stars in that direction and he could almost feel them. They were just stars, however, and having them there didn't make him feel any less lonely. The black hole inside him was going to make him implode.

The numbers on the timer blurred and he tried to tell himself that a drop of perspiration had run into his eye. But he knew it was a tear. He blinked and gasped and felt mucus run over his lip.

Keep the cadence. Watch the timer.

The pains were beginning in his legs. He expected them, but they were early. He would not be able to tolerate this kind of pain for over half the race. He was going to fail and the whole world was watching him do it.

Coming up on 30 minutes. He had to be better than 36.1 or he wouldn't make it. He tilted his head down involuntarily, like he was doing an earthbound road race, and pushed his feet harder while he watched the LED on the timer. Strategically, it was not a good time to make a debilitating

push, but he had to do something for his morale. He tried to think round circles with his feet and move faster, faster, faster. He had to do something to suppress the fear. He pushed, feeling his cadence approach the limit of control. The timer hit 30 minutes and less than a second later the counter went to 36.2. He did it. God, his legs hurt. And the fear was back. He had regained his performance level, but the fear was back.

Keep the cadence. Watch the timer.

The numbers on the lap counter moved so slowly and his spinning legs hurt so much. He tried to take his eyes away from the counter. He couldn't do more than his best. That's all they could expect. But that wasn't all they did expect. There were millions, no billions, of people watching him and expecting him to do more than his best.

His breath wheezed and the pain began to travel up his pumping legs into his hips. The sweat ran down his head into his eyes and behind his ears. Coming up on 45 minutes and the lap counter showed 54.2 with the blur of changing hundredths to the right of the two. He was on schedule, but it was all he could do. He had no idea how he was going to make the effort for the sprint. The fear might take over any second.

Keep the cadence. Watch the timer.

God, it was quiet. Deathly quiet. Where was the cheering? Of course, he was on the moon. He couldn't hear the cheering.

The cheering? That was it, he couldn't do it without the cheering. Then he knew the source of his fear. There was nobody out here to help him. A man doesn't do things by himself. He and his father had cheered for Eddy Merckx to win. And his father had cheered for him to win. But now he was out here alone. There was nobody to cheer him. Just a bunch of spacesuits waiting for him to fail.

Keep the cadence. Watch the timer.

He wanted to shake the sweat from his eyes. He dare not move his head at this speed. He could feel the tension in his neck and shoulders again. Then he did move his head, an involuntary twist to stretch the tension out of his neck. And doing it, he caught sight of the earth hanging in the sky.

He had a vision. Suddenly he knew he wasn't alone. He knew the world was teeming with billions of people who wanted him to win. They didn't want him to fail. They wanted him to win. They were cheering him whether he could hear it or not. **WHIT-NEY WHIT-NEY WHIT-NEY.**

Coming up on 59 minutes and his lap counter showed just over 72. He was ahead. The fear was gone and he was ahead. The crowd was working for him. He knew he was pushing 130 rpm. He watched the tenths change shape on the lap counter and he began to laugh. Four, 5, 6, 7, 8, ha ha ha ha, 9. The lap counter moved to 73 and as the timer crawled to 60 minutes, it flashed to 73.4—73.4 kilometers—and some hundredths and thousandths dancing in a blur on the far right of the display. Whitney could hear the cheers. He could hear the cheers through a perfect vacuum. He hoped they would throw flowers.

—G—

MARATE AND THE BEAST

Dona Vaughn

HE CAME IN OVER THE HIGH MEADOW, his lips stretched back into a thin grin, his hands empty, weaponless. The jaunty lope was gone, but it was the same male.

Pausing at the end post of the gathawood fence, he sniffed it at great length. Satisfied at last, he relieved himself copiously. Marate, hidden in the rocks on the hillside above the gray stone storehouse, bit her lip to keep from laughing out loud. Where did he get so much liquid? For that matter, how far had he come with bladder distended for the purpose of marking this furthest edge of his territory?

A small shower of gravel slid down the rocks behind her. She whirled, bringing the rifle up to her shoulder, ready, and wondered if she would pay for this morning's amusement with her life. Then she saw with a feeling compounded of equal parts of anger and relief that it was Bith clambering down over the rocks toward her. Her younger sister had been gone so long from Clemma Cluster that she had forgotten the elementary laws of self-preservation every girlchild learned in the nursery. She would have to be reminded.

Marate turned back to observe the male. It had been a bad winter and a late spring; she could count his ribs from here. His limp was pronounced. The wound in his leg had been a bad one, the worst she had ever seen. Why she had ever bothered to try to patch up a beast like him was beyond her. She was growing soft and middle-headed. Of course he ripped off the simple bandage as soon as he regained consciousness, and it had healed badly. Even at that he might make it through another season or two if he stayed out of the fields and away from the sentries' rifles.

Bith slid the last few feet with a cheerful curse that rang out loudly in the morning silence. The male jerked up his head. Marate brought the rifle up and aimed it at his chest. She hissed at Bith to be quiet.

Bith leaned back against the rock, not particularly cowed. "I have no doubt that if he starts this way, big sister, you'll drop him in his tracks."

"I don't care to do that unless it becomes absolutely necessary. I trust you'll oblige me by keeping your voice down," Marate said coldly.

Bith grinned. "Certainly."

The male had lost interest in the strange sounds on the

morning out and was methodically trying each window of the storehouse.

Marate leaned back against the rock herself, but she kept her hand on the rifle beside her. "What are you doing up so early? I thought city folk slept till midday."

"I wanted to talk to you."

"Oh? Couldn't it have waited until I got back to the Cluster?"

"No, it couldn't. I want to straighten out this misunderstanding before it goes any further. With Teasel ragging you last night, I couldn't bring myself to force the issue, but—"

"Teasel doesn't bother me. Not since you're back, anyway. All her sly insinuations count for nothing now. You don't know how happy you've—"

"Will you listen to me!"

The male stood like a statue, the rock in his hand still lifted to strike at the window of the storehouse, and studied the hillside. Marate dragged Bith down behind the cover of the rocks. She waited a good thirty seconds before she raised her head and looked down at the storehouse again. The male was gone.

"Come on," she said and pulled Bith to her feet.

"What now? He's disappeared."

"He'll circle around and try to cut us off. He's smarter than most of them," Marate said grimly. She scrambled back up the rocky slope the way Bith had come. She could hear Bith muttering behind her, so she didn't waste energy turning to check on her little sister's progress. Out of shape, she thought with an inner grin. At the top of the hill she paused to look back while Bith clung to a tree and gasped for breath.

The male crouched at the place on the hillside where they had been minutes before, sniffing at the surface of the rocks. After a few moments he made his halting way back down the hillside in the direction of the storehouse.

"We're safe now," Marate said. "He won't risk coming this close to the Cluster." She turned and looked at her sister. "What's wrong with you, anyway? Have you forgotten everything you ever knew? It's eight weeks to the Ripeing and ten until Harvest and those males are hungry and mean. If Teasel saw you acting like an off-world fool, she wouldn't think your coming back was a good idea at all."

"She'd be right," Bith said. "It isn't a good idea. That's



why I'm not going to do it."

"I don't understand what—"

"When I wrote you, I told you then it was only a visit."

"Yes, but now that you're back, now that you've seen Deben, and the situation here, surely you—"

"I have the greatest opportunity of my life waiting for me back at Kareske. I'm going off-world."

"Don't be stupid. They'd never take you. They think we're savages."

"They don't think I'm a savage. That's what I've spent the past ten years working to prove. And I've done it. I'm going!" Bith's defiance faded. "Oh, Marate, please don't be angry with me. Be happy for me. It's what I've hoped for all my life. Now it's finally coming true. Just like a beautiful dream."

"But the Cluster needs you. And Deben, what about her?" "What about her?" Bith said belligerently. "She's getting better care than I could ever give her. I'm not the motherly type."

Marate stared at her. How could she make this stranger understand? "It's the succession," she began tentatively.

Dona Vaughn

"Oh, you'll take care of that. Just bed down with the least rank-smelling male at Harvest and present them with a baby girl for a change."

"I'm not going to try again." She turned away from Bith's searching stare. "I can't stand to go through with it again."

"Just because you had a male before—"

"Twice. I didn't write you about the last one."

"So that's what Teasel was needing you about."

"It's not just that. Andas Cluster is trying to claim the fields to the north. It may come to a fight. If so, there's a good chance something could happen to me, and that's more fuel for Teasel's fire. She's got three daughters, you know, and she never lets anyone forget it. That's why you must stay. You've had a girl. You could have another one. Deben will succeed me, but only if we have another girl to hold Teasel back."

"I couldn't do it if I wanted to. I'll be off-world by Harvest. There's no way I—"

"There is! Don't go. Stay here at the Cluster. This is your problem as well as mine. Your daughter will be chief after

GAILEO 79

me." Bith's usually mobile face was impassive. "Don't you care?"

"No," Bith said. "I don't."

AS IF TO GO OUT OF HER WAY to prove how little she cared for Clemma Cluster and its opinion of her, she shocked her table at dinner by going on and on about the bizarre customs of the off-world males and females with whom she worked in Kazeske. She told how they ate together, talked together, and yes, slept together, year around and not just at Harvest season. Fain and Urua excused themselves and hurried off to the kitchen, but Teasel sat and listened, a malicious grin on her broad face, storing it all up for use as future ammunition.

"I have friends who are male," Bith announced. Urua, who had stuck her head back through the kitchen door, hastily withdrew it. "They can think every bit as well as I can."

"That's not surprising," Teasel said, and a small snicker raged around the room.

Bith ignored her. "My friend, Jilord, has a theory about Indalris. He thinks..." She paused at the little flutter of disgust in the women's faces at the thought of someone quoting a male, then raised her voice and continued, "He thinks that we developed as we did because of famines in our prehistoric times. According to him, males are only tolerated during the harvest season because food is plentiful then. Their repulsion at other times is due to the scarcity of food. Jilord thinks that originally it had nothing to do with any defects in the male mentality. Their lower mental ability is simply due to inadequate nutrition. Because we chase the poor things off, you see," she finished brightly.

She didn't seem to realize the enormity of what she had said. Before the silence could lengthen, Marate stood up. "Come outside with me, Bith. I have something I want to show you."

Bith came, but reluctantly. Outside she said impatiently, "Show me quickly so I can get back. I was trying to make a point in there."

"You made it, little sister. A few more points like that and you'll scuttle any chance Deben has to succeed me. This system has worked far longer than you or I have been around. Don't you see that—"

"I see that you're as prejudiced as the rest of them. I tell you I know males in Kazeske who are the equal of any woman here. Some are even—" She caught her lower lip between her teeth and looked up at Marate with a pleading expression that Marate remembered well from their childhood. It meant, "I almost said something terrible, but don't punish me." It was a charming trick and it usually worked.

Marate laughed. "You might as well go on, little sister. I can guess what you were going to say. Some are even our betters."

Bith sighed with relief. "I thought you would say I was blaspheming."

Marate chuckled. "You were." Then she grew stern. She was, after all, chief of Clemma Cluster and it would be well for Bith to remember it. "But those off-worlders are not our males."

"Jilord says if we gave our males a chance to develop, they would—"

"Jilord again! How close are you to this off-world male, little sister?" She watched the blush spread across Bith's face in answer and turned away to watch the sunset. After a moment she said, "They are no better than beasts, our

males." She heard Bith suck in her breath as if to protest. She must have thought better of it, for she kept silent. "The first time I cubbed, I was too young and inexperienced to know what was happening. The Cluster turned him out before I was back on my feet. I don't know whether his own kind found him or whether predators got to him first." She studied the jagged streaks of orange in the sky overhead. "I wonder sometimes." Gradually the orange faded. "The second time... I was ready for them. I was chief then and a fair one. I had more respect then. The succession was assured by Deben and everyone thought you would be back at next Harvest to cub again. So it wasn't hard to talk them into letting me keep the cub when it turned out to be a male."

"I never dreamed you would—"

"Neither did I. But if you could have seen him. They look very much like our kind at that age. It's only later that... I kept him long past the normal time to turn him out. I wanted to keep him here forever." She felt the blush spreading over her cheekbones and kept her face turned toward the dying sunset. "I treated him like he was a female instead of a beast." She laughed, remembering. "But if you could have seen the havoc he caused in the Cluster you would have thought him a beast for sure. Still, he had a cunning way about him and I neglected my duties to care for him. I ignored the talk; I was completely engrossed in him. That was when Teasel gained so much ground against me. It was not just myself I was injuring, but you and Deben as well."

"And?" her sister prompted. "What happened to him?"

Marate sighed. "He just slipped away one night, like the animal he was. All the fine treatment and good food couldn't change his basic temperament. He was happier with his own kind. I have no doubt."

After a moment Bith said, "I'm sorry, Marate. I really am. But there's nothing I can do about it."

"There is something you can do. Stay on. For my sake. For Deben's." She thought of Bith's off-world male. "For your own."

Bith shrugged impatiently and walked away without saying a word. It was another trick from her childhood, one Marate found not so charming.

SHE DREAMED THAT NIGHT of the Harvest where she got her second cub, of the male she had chosen. She woke up in the middle of the dream and lay awake, remembering the pattern of hairs on his face and the white scar that split his right eyebrow into two sections. Remembering the wiry feel of the hair on his chest against her bare breasts, the involuntary way she had arched her back and strained against him. What would it have been like if he were more than a beast, she wondered as she drifted toward sleep again. What if he were a rational creature like Bith's Jilord?

Marate rose before daybreak. Recalling the way the male's ribs had stuck out, she stopped in the kitchen and bundled up a small package of leftovers from the evening before.

Fingers of dawn were reaching up into the sky when she approached the storehouse. She put the food on the ground in front of the door and then took a circuitous path back up the hill. This time she chose a different place of concealment. This male had a better memory than most. He might think to check the place where she had waited yesterday before he approached the storehouse. Once he found the food, however, he would forget about her.

This time she didn't see which direction he came from.

MARATE AND THE BEAST

Suddenly, without warning, he appeared in the place where she and Bith had been the day before, sniffing at the rocks. Then he made his way down the slope toward the storehouse. It was slow going and he fell twice. The leg was much worse. If he could make it the next few weeks until Ripening and Harvest, he might be able to store up enough food to survive the winter. But looking at him now, she doubted it.

When he reached the storehouse, he found the food at once, but to her amazement he didn't eat it. He sniffed at it and then at the doorframe and she remembered placing her hand there. He turned and gazed up the hill, and she ducked her head. When she looked again, he was eating the food, but he wasn't gobbling it as she had expected. He was chewing it slowly and thoughtfully. She found herself wondering if he had connected her smell with the scent on the bandage she had placed on his wounded leg while he lay unconscious. And if he had, what would it mean to a beast?

She spent the day trying to reacquaint Bith with the joys of motherhood after a ten-year hiatus. For a while she thought she had won. Deben was a charming girl and she and Bith got along well. But at bedtime Bith came to her and said, "It won't work, Marate. I'm leaving day after tomorrow. I should go tomorrow, but I've promised the day to Deben. I'll be sorry to leave her. Your plan worked that well." Bith looked older, less the child herself. "But I will leave."

"It's the male, isn't it? That off-world male."

"He has a name," Bith said haughtily. "Jilord. I'm going with Jilord."

"How can you feel like that about a male?" Marate cried, and the ragged sound of desperation in her own voice frightened her.

Bith shook her head. "I could never explain it to you."

Marate raided the kitchen before dawn again, but this time she took more. Taseel had commented on the disappearance of the leftovers and suggested an inventory be kept until Harvest. She had hinted that it was Bith who took the food and, thoroughly ashamed of herself, Marate had let the accusation pass unchallenged. She filled a bag with hard rolls and cheeses, things that would keep. It might be days before she dared take another chance like this and the male was weak.

Dawn was breaking by the time she reached the storehouse. She left the food on the ground in front of the storehouse door again and scrambled back up the hillside. The second hiding place still offered the best cover, so she used it again. Time dragged by but the male did not appear. She began to fear that her offering of food had come too late and the male was now too weak to be helped. Then she heard a faint, heart-stopping whisper of movement behind her.

She whirled, the rifle up and ready, and then in the instant before she pulled the trigger, she saw that the figure in her sights was Bith, and behind her, wide-eyed and pale, stood Deben.

"Bith! You fool! Why did you bring her here?"

"I'm showing her the countryside. I remember how much I hated to be cooped up at her age. These Archaic rules of the Cluster are—"

"The rules are for her safety. The safety of the Cluster. We've got to get her back. Right now."

She took Deben's arm more roughly than she had intended. The girl backed away from her, frightened, her eyes on the rifle in Marate's hands. "Bith said it was all right to—"

"Bith doesn't know the danger." She tried a smile, but Deben didn't respond. She laid the rifle down at her feet and

held out her open arms. "Come here, child. We'll go back to the Cluster together and I'll show you some funny drawings Bith did when she was just your age. I'll bet she's forgotten all about them."

Deben took a hesitant step forward and then froze, looking up, over Marate's shoulder. Beside her, Bith screamed. Marate reached for the rifle, cursing herself for laying it down in the first place, knowing as her fingers closed on it, as she lifted it up, that it was going to be too late, and the male was upon her.

Then as their bodies toppled over toward the ground in a strange timeless world she had never experienced before, where milliseconds dragged into years, she pulled the trigger.

They landed, the male still on top, with a force that drove the breath out of her lungs. But he was clutching his shattered kneecap, not her, and she pushed him off and rolled aside before his attention could refocus.

She scrambled to her feet and trained the rifle on him. He was moaning and rolling around, still clutching his bloody kneecap, and she saw with sorrow that it was his good leg that was ruined beyond repair. She risked a quick glance over her shoulder. Bith was pressed back against the rocky hillside, gripping a sick-looking, terrified Deben by the shoulders. "Take her up to the top of the hill and wait for me," Marate said roughly. She didn't watch to see if they obeyed. They would. The full authority of a chief was in her voice.

The male's eyes were glazed with pain, but he had stopped rolling about and was watching her rifle. He had connected the awful pain in his leg with the female in front of him.

"I wish, oh how I wish it had been the other leg," she said softly. He would never make it to Harvest now. It was a kindness to put him out of his misery, no more than she would do for any other beast, but there was no strength left in her hand to pull the trigger.

With a great effort he struggled up to a sitting position, still eyeing the rifle. Grabbing at the rocks for support, he pulled himself up to his feet. He took one awful step on his shattered leg before her finger tightened on the trigger.

He twisted as he fell and ended face down on the bloody rocks. Cautiously, she turned him over. There were other scars, newer ones, but the small white scar that split his eyebrow into two sections was still there, the one she had seen and remembered the day she bandaged up his wounded leg. She knelt beside him until the stupid tears stopped running down her cheeks.

Bith and Deben waited at the top of the hill. "Is he dead?" Bith asked, excited now that the danger was over. "I never realized how vicious they could be. Jilord will never believe—they're really beasts, just like you said."

Marate looked at Deben's frightened face. "Go on back to the Cluster, Deben. We'll be right behind you."

Deben turned and raced off through the woods, glad to be away from that place. Marate watched until she was out of sight, and then she turned to her sister in feelings as well as flesh. "Pack your things and go. Bith. Go to Jilord. But go today."

Anger sparked in Bith's eyes, but a quick glance at Marate's face drained the color from her own. Without a word she turned and hurried after Deben.

When she, too, was out of sight, Marate followed, slowly, without looking back.

—G—



DUE PROCESS

D.C. Poyer

THE WASHINGTON SKY WAS GRAY, and cold, and wet. The building loomed above them, granite-gray; and below it, almost filling Constitution Avenue, was the crowd, struggling against the lines of grim-faced police lining the path up the long stone stairway.

The sound of the mob hit them as they opened the doors of the white Ford van. It was the roar of a live volcano, a roar blended of shouts, catcalls, chants, obscenities.

"Don't let it get to you, Eric," said John Etinger, reaching up into the van to pull him forward. Two large men in dark business suits rolled a dolly up to the cargo door. "It's only ignorance. Not hate. Not really hate."

Eric could barely hear him above the waves of sound. He looked down from the door, scanning the familiar, reassuring features: long, lined face; gaunt, Lincolnian frame; the remnants of a boyish cowl long gone gray. One edge of Etinger's lip curled upward as he saw Eric's glance.

"Fancy me telling you not to be nervous," he said.

"There, that's close enough. Now, take these two handles, and pull. There's a platform underneath him that slides out."

The two burly men listened impassively to the large young

woman with the commanding voice, nodded, and took a firm grip on the handles. They pulled. Eric rolled smoothly out of the van and they caught his weight and eased him carefully down onto the dolly, grunting at the unexpected heaviness.

As he came into their view the roar of the crowd redoubled. Strobes began to flicker farther up the stairs, where newsmen and TV crews were waiting. A few pieces of trash and a bottle came over the line of police as they struggled to drive the protesters back from the white van.

Eric watched the bottle. It fell short and smashed on the pavement.

Two more of the beefy men—Justice Department, he thought—fell in astern, and the party began to move forward. Flanked by Etinger and the woman, he was carried slowly up the broad marble staircase, toward the bronze doors of the Supreme Court.

They were halfway through when a group of reporters broke past the police. The first newsmen to reach them thrust out a cordless mike with the silver-and-black colophon of UBC on it. "Ms. Schramm!" he shouted. "Ms. Schramm! We'd like to hear Eric talk! Ms. Schramm, please!"

"Ignore them, Eric," said Etinger, not looking at the reporters. "Gina, don't talk to them."

But Regina Schramm had already faced the representatives of the media, taking a fusillade of strobe flashes full in her face. "Eric has no comment," she snapped. "If you have questions, you may ask me."

Behind her back, she waved the others on up the stairs. Etinger chuckled. As they labored on up they heard the barrage begin to fall on her:

"Ms. Schramm! Are you confident about the Court's verdict?"

"Counselor! If the guilty decision is upheld, what do you think Dr. Etinger's penalty should be?"

"Ms. Schramm, can you tell our television audience what Eric is really like, as a person, we mean?"

"Ms. Schramm! How does it feel to have a computer as a client?"

One newswoman almost sprang at Regina, thrusting a folded tabloid into her face. "Have you read this morning's *National Questioner*, Counselor? Do you have any comment on Delevan's article?"

Eric looked backward, zoomed and froze the front page of the paper in the millisecond it faced him, retrieved the image, and read:

SUPREME COURT TO RULE ON ETINGER CASE

Last appeal for convicted computer thief.

A *Questioner* analysis by Dan Delevan.

WASHINGTON—Last January Dr. John Etinger secretly removed a computer from the International Computing Machines laboratory in Albany, N.Y. Today the appeal of his conviction for grand theft will be heard by the highest court in the land.

Dr. Etinger, an internationally famous scientist, headed ICM's research labs for five years, and was the key figure in the development of the enormously profitable ICM 1110 line of 'talking computers.' His project since then has been the development of a computer that, in his words, "can really think." The result of this project was the Etinger-mode Reintegrative Intelligent Computer—ERIC.

Etinger's defense is based on the shaky grounds that he was not stealing but liberating the computer. He presents his theft as the freeing of a person from

involuntary servitude, which he states the computer itself requested; reasoning, apparently, that since ERIC is 'intelligent,' he should enjoy the rights and protections of the law.

This defense is dubious at best. ICM spokesman Dr. Harry Thorstad, who worked under Etinger at Albany, downplays the 'intelligence' of the computer. "This machine does not actually think," he explained in a recent televised interview. "But there is at times a strong illusion of there being 'someone there,' due to the extreme complexity of the responses that Dr. Etinger has been able to store in ERIC's memory. In my opinion the Doctor has been himself misled by this very phenomenon..."

Defending Etinger is Counsel Regina Schramm, a brilliant defense lawyer and avowed activist and radical. She has fought the Etinger case through the original trial and three appeals. But so far Dr. Etinger has been losing. He now faces a sentence of from five to seven years, imposed by the New York State Court of Appeals, for grand theft. As for ERIC, it,—or, according to the Doctor, he—faces being returned to the ICM labs for analysis to determine the nature of his apparent 'intelligence.'

The outcome of the trial will be reported in full...

AS HE FINISHED READING the stored image, his bearers topped the stairs—and for a moment he forgot about the trial, forgot about John, forgot about his own fate. They had reached the portico, and the panting men set him down to snatch a rest. His camera whined, swivelling hungrily at his surroundings, and he froze and filed still after still.

It was by far the most impressive building he had seen in a little over two years of life. On either side of him vast marble columns, fluted and carved in the classification he recognized as *Corinthian*, soared upward beyond the elevation limits of his camera. The sculptures that guarded the portal were breathtaking. The simple grace and dignity in their postures, the sightless face of Justice, stirred something indefinable within him.

Regina caught up; she had broken away at last from the shouting knot of TV people and reporters. She was still cursing. The bearers grunted again under Eric's weight—they were tiring; he was not light—and went forward again, through the great doors. An old usher waved them down the entrance hall.

The camera's servos whined crazily. The chamber, Eric thought, was even more magnificent. It was one vast room, colonnaded with brown and yellow marble, high-windowed, with deep red velvet curtains and shining mahogany desks. As the agents toiled to set him upright behind the appellant's desk, Regina briskly snapped open files and briefcases and laid them out. Only Etinger noticed the activity of Eric's camera.

"Pretty impressive place, eh?" he murmured.

"Terrific," he said, keeping his volume low to avoid carrying to the packed visitors' galleries. "I can feel the dignity here, John. The permanence."

Etinger grinned and did not reply; it was almost noon, and the audience was quieting.

Suddenly came the sharp rap of a gavel, and wind seemed to sweep across the room, lifting everyone to his feet. Eric fronted his camera. The curtains parted at one side of the long

hunch, and one by one the black-robed Justices filed out. From somewhere a high-pitched voice cried, "Oyez, oyez, oyez. All persons having business before the Honorable, the Supreme Court of the United States, are admonished to draw near and give their attention, for the court is now sitting. God save the United States and this Honorable Court!"

The audience, the attorneys, and even the newspeople waited for a few seconds, until all nine Justices had seated themselves; then they, too, sat with an echoing rustle of cloth. This was swiftly followed by the shuffle of papers and the *quick-swoosh* of a microphone Factsearcher. At that sound Eric looked quickly round, across the courtroom.

His camera stared straight into the levelled gaze of his enemy.

Harrison Woodlawn III was looking well. The bustle of a court was his element. He sat easily at the respondent's desk, his big body athletic even in repose. One large manicured hand toyed with the keyboard of the briefcase-model ICM Factsearcher; and his eyes, frank and open and blue and *rough-crinkled*, were looking straight at Eric's lenses. He was grinning easily, confidently, and the strong-jawed tanned *ace* and the white sideburns and the expensive, slightly *aded*, dark-hued suit backed up the unspoken but oh-so-clear message that radiated from him to all corners of the courtroom: *You all know me. You can all trust me. I, Harrison Woodlawn III, right hand of Power, chief counsel for great 'CM—I will right this travesty. I will complete the destruction if the guilty. I will preserve the mastery for my fellow men. For my fellow white rich powerful successful men.*

Seated beside Woodlawn, thumbing through notes, was little Harry Thorstad from the Albany lab. He looked tired, Eric noted, as if he had been up all night.

He began to wonder whether Woodlawn, who was still looking in their direction, was trying to stare him down. But then he realized that he was looking past them, in the direction of the press boxes. Although cameras were still forbidden inside the Court, there were probably artists there, busily sketching the scene for that evening's news. Eric dismissed Woodlawn from his mind and looked forward, toward the bench.

The nine Justices had said nothing so far, and had moved little since sitting down. They seemed absorbed in some papers on the desk before them; occasionally one leaned toward his neighbor and exchanged a few words. As he studied the grave expressions, the down-turned eyes, the long aged faces that turned slowly to murmur *asides*, he felt that if human justice did exist, it would be found here, in the greatest court of all.

He zoomed the camera, scanning faces one by one, recalling the briefing Regina had given him.

Green, the oldest member of the Court at 85, the last of the old-style conservatives. Weissman, a brilliant logician, former dean of Brandeis and for three years Ambassador to the United Nations. Collins, a colorless man, one of former President Wychauer's least-inspired appointees in the late '80s. Merrick, a career corporation lawyer, counsel for General Solar in its early years—he, thought Eric, could be counted on for a guilty vote. Lewis and Degolia, steady men, moderates appointed by the last Republican administration. Scotters, the dissenter, the renegade, often on moral grounds; he was a Mormon. Brown, the lone black on the present court, with a record in criminal law reaching back to the '50s.

And the small, pain-ridden figure in the center chair.

D.C. Poyer

Ostensibly, Chief Justice Batchelor was only first among equals, but it was widely known that many of the seven-two decisions of the last three years were due to the Earl Warren-style arm-twisting and horse-trading Batchelor conducted in the conference room.

Gradually, the shuffling of papers ceased, the court quitted, and the Justices lifted their eyes as they finished reading Regina's brief and looked down at Eric.

What they saw was not impressive. His outer shape was boxlike, fabricated from a tough aluminum alloy, wrinkle-finished in a sandy color. Not unlike, say, a large filing cabinet. From the top rose his 'eye,' a single, servo-trainable TV camera. A wheeled dolly allowed him to move about, with human help.

That was all they saw; but the outer skin was only a shell. Basically cosmetic, it hid a complex mass of equipment: a small isotope power source, conversion and power supply wiring to supply 15 different voltages at 400 HZ, air cleaning and filtering units, and three 1110-model billion-bit memory units. And inside all of it, far beneath the attractively wrinkle-finished shell, was a basketball-sized sphere of microelectronics.

Eric.

"Miss Schramm," said the Chief Justice, "are you ready to begin?"

"Yes, Your Honor."

"The Court has studied your brief for the appellant with interest, as well as that furnished by Mr. Woodlawn for the respondent. They are both quite thorough. But they are not totally convincing."

Woodlawn moved to jot down a note, eyes gleaming. Regina stood still, waiting.

"The court will hear scheduled oral arguments today. But it seems to us that a personal appearance by the appellant, Dr. Etinger, and by the object or person in question—that is, the computer—would better enable us to pass on the Court of Appeals' interpretation of existing law. Would your client, or clients, be willing to so testify?"

"Yes, Your Honor, they would," said Regina.

"Very good. Tomorrow. You may begin oral argument, Miss Schramm."

As Regina stepped to the reading desk, Woodlawn leaned back in his chair, and Eric, watching him, neither liked nor trusted the look in his eyes.

AT TWO O'CLOCK the Court recessed for lunch. Etinger stayed in his seat, waiting until the audience had left, talking to Eric in low tones. At last he stood up and stretched, with a groan. He looked across at the respondent's desk. Woodlawn was getting up, too, pulling on a raincoat.

"Hungry, John?" said Regina, tilting her round face up at him.

He shrugged. "Not really. Too nervous, I guess."

"You should go out for a sandwich. Maybe a drink with it, to relax you. You won't be called today."

He pulled at his chin. "Maybe I should. After the decision tomorrow, there may not be any more drinks for me for a long time."

"Don't worry. We'll pull through."

"I hope so." He turned to Eric. "What do you think, champ?"

"Why not have one? If it relaxes you."

"I didn't mean—oh, never mind. I'll be back before the

recess ends. Gina. Bring you back anything? Ham sandwich, maybe?"

"You know I'm a vegetarian," she said, deep in her notes again.

He had been dreading the press, but when he went outside it was raining hard; they had all taken cover somewhere. He stood alone at the curb and looked for a taxi. None came by for several minutes and he shivered as a rivulet of cold rainwater trickled down his neck. At last a small electric Yellow pulled out from around the corner. He waved, and it made for him. He ducked quickly inside when it stopped.

"Hello, John," said a familiar voice. The silver sideburns and wide smile seemed to gleam in the shadow of the cab. "Sorry to be so dramatic—meeting you like this, I mean. But I didn't want that cow Schramm around. Just you and me—two old company men. Right, John?"

"I have nothing to say to you, Woodlawn," said Etinger, recovering himself. "Regina Schramm's a good lawyer—and that's all I'm going to say." He reached for the door handle. "So long, Woodlawn."

"Now, don't be like that, Jack," said Harrison Woodlawn. His voice was smooth and friendly, but the big hand that closed on the doctor's arm was like steel. "Sit down for a minute. I know we're on different sides on this one, but we can still discuss our differences like reasonable men, can't we?"

Etinger looked out the window; the cab was rolling now, and the rain had turned into a heavy downpour. "All right. What have you got to say? Return Eric and you'll drop the charges? That's not the point of this at all."

Woodlawn laughed. "That would be a joke—fight it right up to the Supreme Court and then drop the charges. No, Jack, that wouldn't get either of us what we want."

"Well, then, what?"

Woodlawn reached inside his jacket, and laid something between them on the seat. It was smooth and small and flat, and Etinger recoiled from it as if it were a live rattlesnake, staring at him from the smooth leatherette with fangs erect.

"That's the deal, Jack," said the chief counsel for ICM, and his voice was devoid of the camaraderie of a moment before. It was flat and hard, like the dry rattle of a snake underfoot, too close to escape. "Reprogram ERIC. Thorstad made up this tape. It contains a nonintegrative 1110 computer mind."

"Murder," whispered Etinger.

"Tomorrow Batchelor will call ERIC to testify. The justices will try it to find out if it's intelligent. If they decide that it is, you'll be innocent of theft, but ICM—and you *must* still have some loyalty to the company. Jack, you *must*—is guilty of imposing involuntary servitude on ERIC, and perhaps liable for kidnapping and other charges as well—it's hard to say how far it will go. If ERIC is judged to be intelligent it will cause immense social upheaval for millions of people."

"If, on the other hand, ERIC is not intelligent, if under questioning it responds like an 1110 and not like a human being, then maybe you're guilty of theft, Jack, but the country and the company are safe. And ICM can *patent, produce, and sell intelligent computers for human ownership and use.*"

Etinger was silent, his face perhaps a little whiter than usual. Woodlawn went on. "Doesn't sound so good for you? Look, Jack, we've known each other for how long—fifteen years? At least. I've talked to the board of directors. They're not sore at you. You're just a gung-ho scientist—hell, let's

admit it, a genius—who thinks a lot of his work. They can forgive that. Jack, they've told me that if you can do this one thing, they'll not only push for a suspended sentence, they'll let you keep the computer."

"Keep it?" Etinger repeated. "Keep what? Without that program Eric is just another Model 1110 with more memory capacity. He's not Eric any more. He... you bastard, you're asking me to kill him!"

"Easy, man," said Woodlawn, glancing through the plexiglass at the driver. "You can reprogram it after the trial, make it 'Eric' again. In fact, we'd want you to; it's the verdict, the precedent we're after. Can't you do that?"

"If you don't know the answer to that, ask your tame engineer Thorstad," said Etinger contemptuously. "The 1110+ with my program is like a newborn child. The capacity is there, but precious little else. I had to bring him up, Woodlawn, educate him... practically burp him. It took three years before he generated his first spontaneous word."

Woodlawn did not reply, but only looked at him. Then he looked down, at his hands. "I was afraid of this, Jack. Afraid you'd react like this. I begin to see how much this... project means to you."

"Then why did you come?"

"This may sound funny to you, Doctor. But I wanted to spare you."

"What do you mean?"

Woodlawn raised his eyes, and sadness lay behind them. *Either he's for real, or he's a damned fine actor*, thought Etinger fleetingly. "Just this," said the lawyer, "ICM's going to win this one, Jack. Any way we have to. It means too much. Do you understand that?" Etinger tried to interrupt, but Woodlawn went on. "There are people out there we bought long ago, Jack. Influence people, key people. Politicians, newsmen, the media. Even the anti-establishment types. They're all on our side. And we're going to win. You know that."

"Do I?"

"I believe you do, Jack, deep down. But what you may not realize is how much it will cost you. I'm not sure you know, Jack, what influence this refusal to cooperate could have on your career."

"A genius—your term, Woodlawn—must be worth something."

"Not in your case. Now, there's no 'blackball' any more. I'm not saying anything like that; we're not gangsters. But you know what sort of connections we have in the industry. A man who can't cooperate with management, for the good of the country—it could be hard for him to find a suitable position any more with a good company, or even a university. Oh, maybe in China or Russia, though we have offices there, too, and I'm sure the word would get out. But nowhere you could feel at home, nowhere you could continue your research."

Etinger did not answer. Woodlawn looked at him steadily for a moment longer, then took out his billfold and dropped a fifty-buck piece into the payslot. "You don't mind if ICM pays the fare?"

"No."

Woodlawn pushed the cassette across the seat. The doctor looked at it and then picked it up and put it in his pocket.

"You know I'm going to erase it," he said.

"I have others," said Woodlawn. "Think about it, Jack."

He tapped on the plexiglass. The taxi stopped.

"See you in court," said Woodlawn. He got out.

"Take me back to the court building," said Etinger to the cabbie when he turned around for instructions.

He was not, he decided, hungry after all.

OUTSIDE. ON THE STREETS OF Washington, it had stopped raining; the din of late afternoon traffic filled Constitution Avenue. But sixty feet above ground level, behind four-foot-thick granite walls, it was silent, so silent as to be almost palpable to the sole occupant of the bare room.

It was a large room, but simply furnished, almost spartan. A worn green carpet covered the seventy-year-old parquet flooring, and over the high windows hung heavy, mustard-colored damask drapes. Two walls of the high-ceilinged room were bare, save for a very few old photographs; the other two walls were lined with shelves, and upon them were ranged, row on row, the leather-bound volumes of the decisions of the highest court of the Republic.

It was the office of the Chief Justice of the United States; and the slight figure of that personage was sitting very quietly, relaxed in one of the famous red-leather chairs, half

Batchellor thought, with some appreciation; it was very much a demonstration of support.

The mixed line of Court and White House police, arms linked, was holding firm against a shoving, screaming crowd of protesters. Batchellor squinted, but the placards and banners were too small for old eyes to make out from sixty feet up. They were all young, of course; and they all were wearing the light-blue nylon jumpsuits that had become the uniform of the rebellious youth of the '90s.

The police seemed to be holding their own, and more were arriving in vans and squad cars. The kids, though unruly, were not throwing anything and seemed to be limiting their assaults to shrill obscenities and shouting. It was nothing to worry about, and so Batchellor drew the drapes and went back to her red leather chair and sat down to think.

I can understand their concern, she thought, letting her head sag back against the chair. She was very weary, with much study as well as the long day of oral arguments. At her age she very much appreciated the review system, in which all she had to do was read arguments and decisions of lower courts, discuss them with the other Justices, and then



turned away from a massive walnut legal desk. One finger still was inverted in a volume of law reports, part of the enormous pile of opinions and briefs and references that littered the top of the desk and spilled to the floor around it.

The Chief Justice, gray head thrown back a little, was staring toward one of the windows, the one that looked out toward the Library of Congress. A thin thread of sound seemed to be seeping through the window. Batchellor slipped a marker into the book, got up painfully, and walked slowly to the window.

Down below, on the pavement, an astonishing sight met Batchellor's eyes. Cries and screams came faintly through the thick glass. The Chief Justice realized that it was a demonstration, the first demonstration within the memory of living men to take place in front of the Supreme Court Building.

The eyes—old, true, but still black and bright as ever—pucked out the two sides down on the concrete. The five policemen assigned to the building must have been augmented in advance by the blue-uniformed dozens of White House police. President Myers was on his toes,

D.C. Poyer

maneuver them to a majority opinion and get that opinion written.

But this case was far too important for a quick review. It was really too important for the Supreme Court at all. *It's really a constitutional question, not a judicial one,* she thought. *But it's in my hands now, the most important case in my career on the bench.*

The snapping black eyes, roving along the wall, stopped at one of the leather-bound books on the wall. 1856. Yes, that was the only analogy, the only real precedent for the case that she, Sarah Batchellor, now had to decide. And she remembered the outcome of that case, and shivered.

In 1856, Roger B. Taney had been Chief Justice for twenty-one years. Appointed by Jackson in 1835, he had brought stature to the court, had continued the high standards set by the first Chief Justice, Marshall. Taney's rulings had reflected his origins: aristocratic, rural, Southern, slaveholding. Until 1856, his Court had concentrated on cases involving the relations between the states and the federal government, extending and clarifying the limited and purposefully ambiguous words of the Constitution.

In 1856, the Taney court had been called to rule on the *Dred Scott* case.

Scott, a Negro slave from Missouri, had been taken by his master through Illinois—a free state. When Scott had been in the free state, of course he had been free, since by state law slaves did not exist in Illinois. When he was taken back to Missouri, then, he was persuaded by abolitionists to sue for his freedom, on the basis that since he had been free once he could not then be returned to slavery.

Taney wrote and delivered the majority opinion. Scott, he said, was still a slave. But he did not stop there.

It will be observed, that the plea applies to that class of persons only whose ancestors were negroes of the African race, and imported into this country, and sold and held as slaves. The only matter in issue before the court, therefore, is whether the descendants of such slaves, when they shall be emancipated, or who are born of parents who had become free before their birth, are citizens of a state, in the sense in which the word citizen is used in the Constitution. The words "people of the United States" and "citizens" are synonymous terms, and mean the same thing. They both describe the political body who, according to our republican institutions, form the sovereignty, and who hold the power and conduct the government through their representatives. They are what we familiarly call the "sovereign people," and every citizen is one of this people, and a constituent member of this sovereignty. The question before us is, whether the class of persons described in the plea in abatement compose a portion of this people, and are constituent members of this sovereignty? *We think they are not, and that they are not included, and were not intended to be included, under the word "citizens" in the Constitution, and can, therefore, claim none of the rights and privileges which that instrument provides for and secures to citizens of the United States.*

In other words, not only was Scott not free and not a citizen, but he could never become one—nor could any other Negro. Ever.

Taney's decision made any further compromise impossible, either in the Court or in the Legislature. The decision of the court was simply rejected (and rightfully, Batchellor thought) in the North, which saw the freedom of the black man as a crusade. The last avenue of peaceful settlement had been firmly closed off by Taney...and the result was the Civil War.

And it could all happen again, thought Batchellor. *Whoever sits on this Court must be ready to decide.* The direction of the nation had been so often determined here—toward war in 1856, toward monopoly capitalism in the 1870s, labor unionism and trust-busting in the early twentieth century, civil rights and integration in the '50s and '60s. Sometimes, with a nudge from above, change had come quietly; sometimes with protest and vicious differences of opinion within the Court itself; and sometimes, when nine old men set themselves to protect a vanishing order, with violence.

Now, thought Batchellor, *there are blacks and women on the court. But does that make it any wiser?* The Fourteenth Amendment states that no person shall be deprived of life, liberty, or property without due process of law. But what is a

person?

The legality of recognizing a machine as intelligent did not concern her as much as it would some of her colleagues. At the level of the Court, she knew, whatever opinion was given, precedent could be found, law could be quoted. Nor, though she would not have admitted it out loud, did the question of whether it was right or wrong. That, Sarah saw as the prerogative of the Congress; *and God knows*, she thought, *they're eager enough to decide right or wrong for others, though loathe to apply any kind of standards to their own behavior*.

No, Sarah Batchellor—and of course the other Justices—had to decide tomorrow whether accepting a machine as a citizen was constitutional. To interpret the designedly imprecise words of a group of men two centuries dead in such a way as to guide the nation for the next hundred years.

She rose and looked out of the window again. Reinforcements, city police in riot helmets, had arrived, and the demonstrators were being forced back from the building. Several of the placards lay face up on the street, and at that angle she could read some of them:

"Give the jobs to humans"

"Machines our tools, not our masters"

"Hang Etlinger"

The last one made Sarah frown. Yes, it could come to that, if people like this had their way. And she thought of Socrates and Galileo and Andrei Sakharov.

Not that this riot was a demonstration of the popular will. No, behind the knots of struggling young people she saw Woodlawn, standing tall and broad and confident, cigar in hand; and behind him ICM, immense, awesome, shadowy. ICM, third-largest corporation in the country. With its two brothers, General Solar and Antarctic Mines, it had supplanted the older power centers. She remembered them, AT&T, GM, and the AFL-CIO; before them, the world-girdling Standard Oil, Ford, and U.S. Steel; before the corporation era, men, like Jay Gould and Morgan. Behind the popular will, beside the elected government, there were always the Interests.

But for the last two centuries, she thought, *there has been one branch of the government that they could not buy or bribe or lobby into submission. And that has been the Court.*

The blue-suited kids on the pavement did not know they were pawns. They thought they were enlightened protesters, fighting for human rights and justice, and they were told this day after day by the networks and the papers and even the records that they bought. ICM had been busy, and its cause was now firmly identified with the dominant liberal philosophy.

Batchellor leaned forward, resting her gray head—so tired—against the cool glass of the window. No, she could not depend on narrow interpretations of the Constitution. That was how Taney had plunged the country into war. The Court had to look ahead, not back; it had to anticipate change, to ward off the violence that accompanied it in most other countries. America was not immune, had never been immune. It was only the fact that it had a government of laws, and not of men or women or whites or blacks, that had enabled it to grow rapidly and, for the most part, peacefully.

It had not fallen to her to be Chief Justice in a time of peace and harmony. Whatever the Court decided, Sarah Batchellor would be in the center of the storm.

Blindfolded Justice stood at the front of the building; and it was to her that Batchellor prayed, leaning against the window

of her office. *For the good of the country, for the good of humankind, may I make the right decision.*



LL AROUND HIM, IT WAS DARK. Only a glimmer of light came from across the hotel room, where closely-drawn drapes shut out the pink-lit night sky.

He had been alone in the sitting room for several hours, ever since John and Regina had gone to bed in the two adjoining rooms of the suite.

Court had adjourned at 4:30 that afternoon, and after loading Eric back into the van they had driven to the hotel.

"Mr. Etinger?" The hotel manager. An armed guard in tan uniform and cap stood behind him. "You requested additional security tonight?"

"Right. Could you give us a hand with this?"

The guard helped to maneuver Eric into the cargo elevator, and got in with them to ride up to the fourth floor suite. The three human beings, plus the tan metal box, filled the elevator; and the guard, not suspecting what it was, saw nothing wrong with perching himself on one corner of it to give Regina more room. Etinger glared at him, but said nothing.

He entered Suite 426 first, clicking on the light in the sitting room and checking each of the bedrooms and closets before coming back to the door. "All clear," he said. "Bring it on in, please. Then you can take your post. I'd like you right outside this door tonight."

"Yes, sir," said the guard, wheeling Eric in and setting him against a wall opposite the window. He touched his cap and left. As soon as the door closed behind him Etinger locked it, bolted it, and turned the door handle to 'Alarm'; an orange light came on, showing that it was live. Regina watched him, hands on her broad hips.

"What's the rent-a-pig for?"

"Just a precaution," said Etinger. He passed one hand over his cowlick, trying unsuccessfully to smooth it down. "I had a talk with Woodlawn today at lunchtime; he caught me in a taxi. He'll stop at nothing to win this case, Gina."

"He hasn't much time," said Eric, moving his camera for the first time since the guard had joined them.

"That's right," said Regina, looking at him. "Tomorrow's the last day of pleading. I think it will be the high point of the trial, when they interview you, Eric."

"You think that will be decisive?" said Etinger. "I'd have thought that the legal arguments would swing."

"No, it'll have to be the appearance. So far, Woodlawn and I have fought each other to a standstill. Precedent is a two-edged sword; the analogies of the legal status of slaves and women can be pushed only so far. No, we have to convince the justices that they're confronted with an intelligence inside Eric's shell."

"But can we win?" persisted the engineer.

"Look, John, if I didn't think we had a chance, I wouldn't have taken this case. You've got Harvard's best, and she's doing her best. But the Chief Justice wants to hear Eric. It'll be up to him to convince the bench of his intelligence."

"How do I go about doing that?" said Eric. "And why? The people in that mob today didn't give me the impression of being very intelligent. They don't convince me. So why should I have to prove it to them?"

"Because if you don't, ICM will get you back and truck you to Albany and tear you apart piece by piece, and that precious shell of yours will spend the rest of its days plugged into a telephone switchboard," said Etinger. "And I'll go to jail for D.C. Poyer

stealing ICM property. So you'd better put on a good show tomorrow, fella."

"Christ, I'm sleepy," said Regina, rubbing one hand over her round plain face. "I was working on my oral arguments all last night. I'm beat, John. I'm just going to have a quick dinner and go to bed early."

"I guess I will, too," said Etinger, looking grim. "Tomorrow's going to be a busy day." Shortly after that they had turned in.

Eric focused his camera on the electric clock on the wall. It was very dim in the sitting room, and the camera—surplus equipment off some lab shelf in Albany, like many of his components—was anything but low-light capable; a human being could see better in the dark. But a bit of the pink light filtered through the drapery to allow him to tell the time: a minute or so before three.

As he did so he heard a slight scraping noise, and swivelled his camera to face it. A dark form was moving across the sitting room toward him. He tried to cry out, but only a muffled sound emerged; a pillow was pressed over his speaker, and a second later the external volume was turned down.

Whoever it was, he thought, knew his control panel. The hand had gone right to the one knob that could silence a cry for help to John or Regina. And then, with horror, he saw the slight sheen of dim light on a metal rod. The screwdriver clicked against the panel, and he heard the sound of screws coming loose. The dark figure, breathing heavily in the silence of the suite, was removing the entire programming protection lock mechanism.

He was going to be destroyed—and there was nothing he could do about it.

He swivelled the camera wildly. It was the only movement he was capable of making, and the low whine of its servos the only sound. It made no difference. Metal scraped as the lock mechanism was removed, and the screwdriver went in again, deeper now, removing the cover of the programming input slot itself.

There was the movement of a pale hand, something scratching against fabric; and then Eric felt the penetrating sensation of a cassette entering the slot and engaging the long-disused tape feed mechanism.

The engagement lit up the "push to program" button on his panel. The dull yellow light illuminated the figure, and his thoughts spun.

It was Regina.

Her mouth was tight, her normally ruddy face pale-looking in the yellow glow. Her hair was tied back, and she was dressed in a blue nylon jumpsuit.

She peered directly into his lens, seemed to consider for a moment, and then cautiously turned up the volume of his speaker a tiny bit.

"Eric... I know you can't really think or feel. But before I do this, I wanted to let you know why," she whispered.

He put full power into his speakers, but only a murmur came out. "Why, Regina? Because you've been paid off by Woodlawn and his corporate hoods?"

She shook her head. "No. I haven't been paid anything. You should know that."

"Why, then? Tell me."

"Because I've finally made a decision I've always known I'd have to make. Harrison Woodlawn did call me, yes. But he didn't offer money; I would have hung up on him. He just talked to me. And so have a lot of my friends—people in the

Movement, people I trust. One of them gave me this tape and told me how to use it."

"Your friends are tools, Regina. Woodlawn and ICM have bought them. They're stooges. Puppets."

Her hand moved, and for a moment he thought he'd gone too far. But she hesitated, then pulled it back. "You're trying to provoke me. But I won't be provoked; this is not an emotional decision. Before you die you must understand that."

"I thought I couldn't think or feel—or die."

She paused. "Whether you can or can't doesn't really matter. A dog can do all those things, but it isn't human. You're not human. And you must be destroyed—for the good of the people."

The box was silent, and she continued, "For the good of the people. You see, Eric, technology has taken away all our humanity—all our craftsmanship, our pride, our closeness to the soil and to each other. The Movement has always opposed it, tried to restore real dignity and worth to people. But ICM and the rest of the Establishment opposed us, and they won and won, until now. Now ICM has finally realized its mistake, and is taking our side. Against its last, most inhuman creation. You."

"I don't really see how my existence can hurt people, Gina," said Eric. *Draw her into an argument, he was thinking. Try to gain time. Maybe John will sense I'm in danger, or wake up and hear our voices.* Plans and probabilities chattered through his mind at fantastic speeds.

He was playing for time, for he did not want to die.

A born lawyer, she took the bait. "Don't you see? Once, people could be proud of the things they could do—sing, make things, farm. Now machines do all that, better, faster. All we have to be proud of now is what we are—*homo sapiens*, the only thinking creature. If you take that away from us we are no more than inferior machines."

"I can't replace humans," he said. "It took a genius years to write my program and educate me. I cost ICM over forty million dollars. I can't replace flesh-and-blood computers who reproduce for free."

"You don't have to replace us," she whispered. "You're smarter than we are. You think a thousand times faster; I've seen you. If you're freed, in this rotten social system you'll be rich in a year. In ten years you and your kind will control us. We will be the slaves."

"If I assured you that it couldn't happen that way? That I have none of your human drive for control, for power?"

"That's a risk we can't take."

"Is it worth killing for?"

"This is not killing," she said hotly, a little too loud, and her voice almost broke. "I don't kill. I don't even eat meat. But you're not even an animal. You're just wires and microelectronics and a TV camera. And yet, you're dangerous—not to me, but to the people—and so it is best that you are destroyed now." Her hand moved to the button, and this time it did not move back. "Any last words, machine?"

There was nothing more he could do. Death...non-existence...*Are souls allotted to ICM 1110+s?* he thought. Would there be a hereafter for a mass of electronics that dared to challenge the uniqueness of man?

He sighed inwardly. No, there were no last messages, no last thoughts. There were no tricks left. He looked at her round, earnest face, pale in the light from the panel. She had brought John so close to victory, herself so close to fame, and

now she was giving it all up...*because she felt that it was wrong.* Where, Eric thought, had he seen a face like hers? And then he remembered. The face of Justice, resolute, determined. And blind.

"Goodbye, Gina. I know you're doing what you think is right. Tell John, if you can...tell him I loved him. Life was great, it was fun, beautiful. Thank him for me; I never did, somehow. And...I understand. I love you, Regina. I love you. Goodbye."

The hand descended, and in the last second he saw her eyes. They were shining with tears.

She pulled the cassette out of its slot.

"You bastard," said a choked whisper in the half-dark room. "You knew...no human being could..."

There was the sound of a sob, whether of rage or sorrow he could not tell, and he was alone in the room.

He sat in the dark and thought. For that was all he could do, all he could ever do. No, he thought, *that's not quite true.* He had just discovered that he could feel. That he could fear. That he could love.

But try as he might he could not cry.

W

HEN THE AUDIENCE SAT DOWN AGAIN, after the entrance of the Justices, the courtroom was deathly quiet. Chief Justice Batchellor studied the notes in front of her for a few seconds, and then looked up.

The courtroom was full; the press section packed. But she had expected that, and she looked down at the litigants.

Woodlawn looked confident. He had only a blank legal pad in front of him; no notes today, no Factsearcher. The ICM scientist—Thorstad, she recalled—fidgeted beside him.

Regina Schramm, in a neat green suit, looked white and withdrawn, while Etinger looked grim. *Something happened,* Batchellor thought. What it had been she could not guess. She studied the featureless, sandy-tan box that stood, oddly out of place, amid the traditional mahogany, leather, and marble of the court, on a wheeled cart beside the appellant's desk.

"Dr. Etinger, your counsel stated yesterday that you were willing to testify in person. Is that correct?" said Batchellor.

The tall man rose. "That is correct, Your Honor."

Justice Merrick spoke first. His heavy voice was full of suspicion as he asked, "Doctor, there seems to be no disagreement between yourself and the respondent, ICM, on one point: that you illegally removed the property in question from company premises in Albany. Correct?"

"Eric is not property, Your Honor."

"That, apparently, is the premise of your entire defense. But you admit that you removed it from the plant without the knowledge or consent of the corporation?"

"Yes, Your Honor."

"Thank you," said Merrick, not smiling.

Justice Weissman looked up, tapped his pencil on polished mahogany. "Why, Doctor? You are not exactly a hardened criminal. Please tell us your reason, in your own words."

"Gladly," said Etinger. He looked across the courtroom, at Woodlawn and Thorstad. "ICM had no objection to my research on producing machine intelligence—controlled machine intelligence. But when the ERIC project began to show signs of personality, such as thoughts unrelated to the problems it was given, independent desires, questions about itself and its identity, this aroused fear. Fear of adverse

public opinion. I believed at the time. No one outside Albany ICM knew about the project; it had been shrouded in industrial secrecy; so the company decided to close down the project and deprogram the computer. But by that time I knew that Eric was really intelligent. I couldn't permit his termination. He wasn't too happy about the idea, either. So one night, two young assistants and I went to the lab and took him out in my van."

"What is this machine worth?" said Justice Lewis.

"If you mean, what did he cost, Eric cost forty million dollars to build and program and train. Plus four years of work. But that's like estimating the worth of a man by adding up his lifetime grocery bills. I think that, like every human being, under our laws he is of infinite worth."

There were no more questions from the bench. The Chief Justice looked around at her colleagues. "No other questions? Then I will ask one, Doctor. Has ICM attempted to force you to modify or injure the computer, to influence this court to—"

"I must object, Your Honor," said Woodlawn. He had sprung to his feet at the word 'force.' "My client is not on trial here. Doctor Etinger is. This sort of smear job you're inviting—"

"This Court does not invite 'smear jobs,' Mr. Woodlawn. Sit down. Dr. Etinger was not sworn and is not testifying. We are merely eliciting background information," said Batchelor.

Woodlawn sat down slowly. A murmur swelled in the audience, then faded as the Chief Justice said, "Answer the question, please, Doctor."

"Yes, they have, Your Honor," said Etinger, looking defiantly at Woodlawn and Thorstad.

"In what form?"

"In the form of a threat. That if Eric was not reprogrammed for this trial I would be blackballed from scientific employment."

"You Honor, may I explain?" said Harrison Woodlawn, bouncing to his feet again.

"Please do."

"I recall the conversation to which the Doctor is referring. He misunderstood my meaning. I made no threats. I simply reminded him that a record of thievery would not be conducive to his employment by any reputable organization."

"That's a lie!" said Etinger, flushing. "He said—"

"That's enough," said Batchelor, warningly. "Sit down, both of you. There will be no name-calling in this Court." The two men sat, glaring at each other across the few meters of space separating them.

The Chief Justice spoke again, rather more loudly than she had to Etinger and Woodlawn.

"Eric?"

ERIC HAD BEEN WATCHING WOODLAWN as unobtrusively as he could. As the Chief Justice called his name, he saw the attorney's head come around. But the chief counsel for ICM was not looking at the computer; his eyes were fixed questioningly on Regina Schramm, who did not look back, but kept her eyes lowered. There were tiny tension lines around the confident mouth.

Eric dropped the base frequency of his voice an octave, clipped the upper and lower ranges, and reverted to the Standard English of ICM Laboratories. "Yes, Your Honor," he said, and watched Woodlawn start and Thorstad whisper to him. They both smiled. He had spoken like an ICM Computavoice, a speech that everyone in America heard when they dialed 'operator.' It was a familiar, routine, D.C. Poyer

completely predictable and limited kind of voice.

And at the sound of it Etinger turned slowly, the blood draining from his face. Eric kept his camera steady, hating to torment John, but...

"Eric, you have been represented by counsel and by Dr. Etinger as a machine intelligence possessed of thought, individuality, and free will, and thus as a citizen entitled to the equal protection of the law."

"Yes, Your Honor."

"Are you?"

"I am an Etinger-mode reintegrative intelligent computer. I possess intelligence equal to a human IQ of 190. The reintegrative faculty function—"

"Your Honor, if I may," interrupted Thorstad, rising and smiling tolerantly. "The Court is being made light of. If the Justices will consult the programming manual that ICM submitted with the brief, you will see that the answer just given is taken from it verbatim. They are not thought out. They are simply programmed responses, such as all model 1110s give in response to questions."

Batchelor raised the brief, flipped through it, and then very deliberately closed it and laid it face-down, before her. "This court is not conducting a programming check on a computer, Dr. Thorstad," she said, and at her tone Thorstad's smile disappeared. "This court is attempting to determine whether intelligence can exist in a non-human form."

The short scientist sat down, swallowing nervously. Confident a moment before, he now looked shaken, and glanced at Woodlawn for support.

"Eric, I am going to ask you a few questions. Please answer them to the best of your ability, without relying on your program, unless, of course, you must."

"Yes, Your Honor. I'm ready."

"Question number one, Eric. Tell us, what constitutes your individuality? What, for you, is 'I'?"

There was a short pause before the sandy-painted box spoke in reply. "There are philosophical answers...but I sense that you do not want those."

"No," said Batchelor. "I want to know your opinion."

"I know how I came to be made. I know the characteristics of my mind and how to vary and control them, within limits. I know that I am different, from other computers as well as from human minds. But as far as what makes me, me...I am sorry, Your Honor, I do not know that."

The Chief Justice nodded, face expressionless. "I see. Second question, then. What will our decision be in this case?"

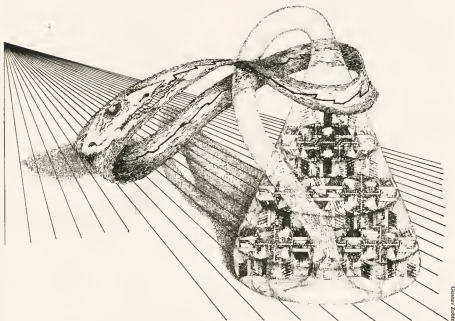
The vast courtroom was silent, waiting. Etinger looked across it at Woodlawn, who was staring at Schramm, eyes narrowed. Thorstad, sitting beside the lawyer, was scribbling furiously on a pad of paper. Eric spoke into the hush, and as it went on the monotonous voice changed, became more vibrant, more thoughtful...more human. "In a logical mode, Your Honor, that would be a simple question to answer. I can analyze legal precedent, and I have in my memory the opinions that each justice of this court has given—for every case in his or her career. To set up a program to correlate these factors would not be difficult. In fact, I've done it, for my own amusement. It takes .05 seconds to run.

"If I were not an E-type computer, that would be my answer, and it is a logically right answer. But I was told something once by Dr. Etinger, and my life since then has

(continued on page 109)

NOBODY LOVES A MOEBIUS STRIP

Alice Laurance



Quaker Zebbie

YOU COULD BE INTERESTED, even fascinated by one, you could conceivably admire one, but nobody loves a Moebius Strip. Particularly not a living one. Even cut out of paper, there's something infuriatingly unreasonable about one, and in the flesh—I shuddered, looking at the creature on the table in front of me and repeated it: nobody loves a Moebius Strip.

The thing had all of the less appealing qualities of a skinned snake which had been flattened by a steam roller and had somehow contrived to swallow part of itself in the process. It

didn't look as if it had only one surface and edge, but I'd proved it by drawing a wavering line around it. The line was unsteady because the thing had tried to wriggle away. It had also made a faintly chortling sound and I made a useless note to the effect that it was probably ticklish. I was at a loss to know how to take its measurements, but if you flattened it out, ignored the unnerving half-twist somewhere in it and measured it doubled over itself, it would have been about a foot long and three inches wide.

It was mobile—or it had been before I'd pinned it to the

NOBODY LOVES A MOEBIUS STRIP

table with a strip of tape—moving like a clumsy conveyor belt. It was flesh-colored. I recognize that could be a controversial description in certain parts of the universe, but I use it in the most precise fashion: the thing was dappled and every conceivable flesh tone was represented on it someplace.

Worst of all, it had features. It had an eye—or perhaps two, I'm not sure. It went through, you see. I mean, it appeared on both sides. Yes, yes, I know, there's only one side. But if you stuck a pin through a paper Moebius Strip, you could turn the paper over and see the prick mark on either side despite the fact that there's only one surface. The eye(s) worked the same way and it stared at me. There was an ear (or a pair of ears, depending on your point of view) and a nose, but the nose didn't go through. It also didn't look much like a real nose. What it looked like was the way a child with little artistic talent would draw a nose: an angle with two dots underneath. But that was nothing compared to the mouth. It was all right when it was closed (it looked like an ordinary drawing of rather thin lips) but when it was opened, you could see right through it. Nobody could possibly love a Moebius Strip.

But it wasn't my job to love it. What I was supposed to do was evaluate it, to judge whether or not the thing had enough intelligence to qualify for diplomatic recognition.

I can see I'd better introduce myself. My name is Clarence Worthington, and I'm Chairman of the Psycho-Biological Department of Terran University. My specialty is the testing of newly encountered species with the object of deciding whether the creature should be placed in the Global Zoo or invited to exchange ambassadors.

We have a wide variety of tests we can administer, depending on the species being evaluated, and they're supposed to be comprehensive. They are comprehensive; I know. I devised most of them.

Put that way, it sounds simple enough, but you can take my word for it, it isn't. To minimize the risk, the cut-off point for diplomatic overtures is depressingly low and, in any borderline situation, the species is given the benefit of the doubt. Even so, you'll still hear stories about some of our more glaring errors, such as the time the Soppoites were placed in the Zoo. They gave us a very impressive, not to say forceful, demonstration of their intelligence and the situation was corrected. But I ask you—how could we know that the Soppoitish faith forbids testing?

But that's history and had nothing to do with the peculiar creature taped to the table in front of me.

Three lab technicians had already attempted to administer the basic tests, and all three were now undergoing extensive therapy as a result. The decision was up to me alone, and I had no idea how to make it. I studied the creature helplessly, listening to its whimpering sounds, and wondered why I'd ever accepted the Department Chairmanship.

Doggedly I worked through the standard tests, knowing in advance what the results would be. Most of the tests were totally useless (Spatial Relationships I didn't even try) and the rest inconclusive. The thing was intelligent, only it wasn't. It all depended on the test, which isn't supposed to happen; the tests are supposed to check each other. Sometimes the thing passed with flying colors; other tests it failed dismally, and there was absolutely no correlation between one result and another. It literally defied analysis.

The thing could reason, at least up to a point, but it couldn't (or wouldn't?) communicate, which is patently ridiculous. Analysis showed that the sounds it made were repeated at uneven intervals, and they were compatible with neo-english,

Alice Laurance

yet it refused to learn any new words. It did, however, react when its own sounds were repeated to it. The reactions were not unpredictable, but they made no sense—if it didn't smile and chortle, it tried to hurl itself at the speaker; sometimes it whimpered.

In desperation, I sent for the dossier on it. It had been brought back by the crew of the *Phoebe II*, which had gone out to investigate a derelict traveling aimlessly in the vicinity of Gamma Geminorum. Their assignment (which I understand is standard) was to check for life, offer any assistance possible and, failing that, to haul the craft in. The derelict had been boarded by several members of the *Phoebe II* crew, who immediately discovered signs of some sort of internal disaster. The power supply was so totally demolished they couldn't even determine what it might have been. They reported no signs of life and were about to abandon the ship when one of the men opened a door they'd missed initially and found himself confronted with an animated Moebius Strip that gave every sign of being in love with him. It leaped at him and attempted frantically to climb up around his leg. He managed to divert it to his arm and brought it out (the deed earned him a medal, a substantial bonus, and an unmerciful ribbing from the rest of the crew). A seaweed-like substance had been found on the ship which proved to be food, and the Moebius Strip was delivered to me in apparently glowing health. There was no clue as to its home planet and a check failed to turn up anyone who'd ever heard of such a species. Despite its unpleasant appearance, it had to be evaluated and, if judged intelligent, invited to send an ambassador to Earth.

I'd run every test I could think of and was no nearer a conclusion than I'd been at the start. I was staring at the thing when the idea hit me; it was mad, but I've always thought that when all sensible alternatives fail, a mad try is better than none, and there was nothing to be lost by trying this.

I placed a Klein's Bottle on the table next to the Moebius Strip and waited. The thing began to inch toward the bottle until the strip of tape stopped it and then it tore frantically at the tape until I released it. With a mighty heave, it hurled itself into the air and settled around the bottle, fitting itself tightly around the surface. It was giving a good imitation of hugging the bottle when it spoke a single word, a word which would be recognized by any intelligent being in the universe.

"Mama," it said plaintively.

The Moebius Strip has been placed in a nursery where it will remain until it grows up, presumably in the form of a Klein's Bottle. It will then be re-tested and, if it passes (as I'm sure it will), it will be offered diplomatic status.

But one question continues to haunt me. Can anybody love a Klein's Bottle?

—G—

IN AN ALIEN WOOD

John Kessel

AFTER SHE'D KNOCKED HIM SENSELESS and left him in the jungle to die, Judge fell into a fitful sleep. He had a nightmare in which he lay in the main street of Brookerville, suffocating, while his friends walking by ignored him, dying there in plain sight. He woke with the smell of earth in his nostrils. There was something nestled into the crook of his ankle. Something alive.

He lifted his head and, by the light that filtered down through the dense foliage of the rain forest, saw a large ball of fur curled beside his feet. Two yellow eyes opened, and it raised its broad triangular head. Judge held his breath: it was a ripper. He'd exterminated hundreds of them: at one time they'd infested the woods around the utopian community. They were extremely vicious and would as soon tear your throat open as look at you. Sam Darden had lost his arm to one just the previous year. The creature yawned, showing a fine collection of teeth, short and long.

Judge slowly pulled his knife from his belt, carefully drew in his legs and sat up. The movement sent an awful pain through his ribs—Marla must have cracked them when she'd kicked him. The ripper just sat there, black forepaws stretched out in front of it, and watched him. It had a handsome pelt: silvery gray with a network of dark violet markings like the fan of a river basin on a map. It had to weigh maybe ten kilos. It had felt warm as it rested by his feet.

He sat there, breathing slowly, testing out the edges of the pain in his ribs. He snapped open the leather pouch at his belt—the ripper watched him curiously, but didn't move. At least she'd left him his knife and his lighter—but she would of course leave him that, it would save her conscience. She hadn't left him helpless in the jungle. Judge closed his burning eyes and rubbed them roughly. Four hundred kilometers to Brookerville, most of it through this dense rain forest, the latter part up the temperate foothills to the central plateau. Marla certainly would not expect him to make that journey. She probably thought he'd try to make for the Rochester Company's base at the mouth of the Lambert.

Marla Parker would be very surprised to see him walk into the Community Center in Brookerville. Judge would calmly go forward to the platform—haggard from the long trek, surely, but of them imagining him dead—take out this same knife and

cut her to ribbons. He felt the cold certainty in him.

He would do it, or die trying.

The ripper still sat, slitted yellow eyes on him, biding its no-doubt carnal thoughts. I can kill you, too, Judge thought. He peered up through the trees, trying to make out where the sun stood in its sixteen-hour traversal of the sky of Xanadu. He couldn't find it, but he knew there couldn't be many hours of daylight left. He would do well to fix himself a fire and a place to sleep. He awkwardly got to his feet and began by searching, without much success, for dry wood. Everything that fell to the earth here rotted, but he managed an armful of moist wood. The ripper was sniffing around the space beneath the trees. Judge kept his eye on it and tried to cut a slender sapling for his lean-to. Pain shot through his ribs whenever he tried to exert any pressure; he pulled back, gasping, and sat down. The ripper waddled over and began to sniff at his hand—Judge readied his knife, frozen in place, heart racing. Come on, damn it, come on! Was that any way to attack a man? He was ready to attack it himself when the animal began licking the back of his hand. Its tongue was dry and raspy, not unpleasant to the touch.

Judge laughed uncontrollably; he shook with it, ribs aching until the pain was almost unbearable—yet still he laughed. The survivor! He was going to get revenge! Even the ripper pitied him! He lay back on the cool earth, chest heaving, listening to the forest sounds. The light was fading, night was coming on. His thoughts were formless.

When he awoke it was dark and the ripper was gone. He heard chittering in the trees above. Judge's stomach was growling, but it was so dark under the trees that he could not see a thing. He fumbled for the lighter, got it lit, and scrambled together the wood he'd collected. The moist under took a long time to catch, Judge all the while in a sweat, but finally the fire was going and the darkness pushed back. The night sounds did not seem half so loud. He tried not to think about how hungry he was.

After a while he heard a rustling in the darkness, and suddenly the ripper trotted into the light. It had something in its jaws—a pink lizard, it looked like—the head of which swung limply. The ripper settled itself at the opposite side of the fire and began tearing at its catch. Judge was surprised to see how deftly it used its forepaws, almost like hands, to rip at



John Kessel

IN AN ALIEN WOOD

the lizard. Despite the raw and ragged look of the meat, Judge found himself jealous. But it would be foolhardy to try to take its prey from the animal.

When the ripper had satisfied itself, it pulled the rest of the lizard around the side of the fire, leaving it within a meter of Judge's hand. It returned to its spot, squatted down with its paws before it, and rested its head on them, watching. Judge pulled the carcass to him, stripped off the skin that remained on the hind legs, and roasted them over the fire. He could not help himself and pulled them out long before they were roasted through, but the warm flesh, disgusting though it was, was good.

He could kill the ripper in the morning, when he had his strength.



ALTER JUDGE WAS, among other things, a sculptor, and one of the founders of the Brookeville Utopian Community. Maria Parker was working in the school that rainy season. They had lived together for five years.

The lifter had hummed over the lowlands on the way back from the Rochester Station, where they'd purchased certain supplies for the community. The jungle rolled out to the horizon in waves, rising and falling with the crests of the great trees, a dark green world rising toward the plateau. He was irritating her, and he knew it. There was something inside Walter that made him do it. He irritated everyone in Brookeville, but he made them recognize his ability, and he would not let them say that he was arbitrary.

"What about freedom? What about moderation?" he'd asked her.

She had never been the talker he was; he could bury her whenever he wanted, but she made her defense.

"Freedom isn't license. Moderation in pursuit of error is not a virtue. We came here to get away from errors."

"Very nice. Where did you read that?" He had told it to her himself.

Maria had given him a queer look then, as if she had never seen him before, at the same time that she seemed infinitely tired of his taunts. Walter had remembered then the time they'd worked together on the Uhata house, a month after they'd met, and she had drawn a straight line of red along the east wall of the entranceway. How absurdly straight that line had been, for something done by the simple movement of her hand and eye. How mysterious that people could do such things. The memory made him angry. Where had that mystery gone?

She pushed a fringe of dirty blond hair behind her ear. "We shouldn't make the same mistakes on Xanadu we made on Earth. You should know better than that—Walter?"

"I'm listening. I'm listening though I've heard it before." Not one person in Brookeville cared for his work. They wanted something else from him.

When she spoke again her voice was choked. "Why do you have to do this to me? Say those things? You don't respect me at all."

"Sure I respect you. Don't be crazy."

"You don't."

She had said it so quietly. That was what had fooled him.

"Jesus! Leave me alone, Maria."

"I'll leave you alone." Then she would say no more.

It had been ten minutes after that that she claimed to have spotted someone in a break in the forest. She'd circled the cargo lifter around and pointed down more than once. Walter

hadn't seen anything, but he'd felt guilty for starting the trouble again and was glad to change the subject. He was even willing to stop and take a look.

They'd touched down amid the ferns and hangers, stepped from the conditioned air of the lifter to the steamy fragrance of the tropic wood. Maria had clubbed him across the back of the head with the dart gun, and while he was down had continued to beat him madly with the rifle butt and kick him in the ribs. She had breathed heavily, grunting with her effort.

"Learn something, Walter," she'd gasped. "Or else die!"

A couple of time during the long night Judge had to scramble around in the darkness for more firewood. When the dawn finally came up beneath the trees without the signal of a rising sun, the ripper was still with him.

"Are you my pet now, killer?" he said. "You don't look like a pet."

The ripper wrinkled its snout at the morning air.

The animal was not acting the way it was supposed to. Naturally there would be more competition with men in the area around Brookeville—this ripper had probably never seen a man before. But that could not alter its basic nature. Walter had himself seen one of these things, unprovoked, badly maul two experienced hunters before they could manage to break its back—and still, unable to use its hind legs, it had tried to attack. Friendly or unfriendly, Judge was wary.

From the lifter as they had cruised westward he had glimpsed the sinuous Lambert twisting to the north on its way to the eastern sea. If he could reach the Lambert, he could follow it upstream to the Sutsuma, its tributary, and thence to the uplands that led to the plateau. It would be twice the trek that the walk to Rochester Station would be (and going downstream he might have made a raft), but at R-station he could do nothing more than beg a passage on the next starship out—a useless detour from an isolated group of crackpots. At Brookeville he could kill a woman who'd tried to kill him. It would not be revenge, but justice.

Judge set off through the tangle of foliage and trees; after a moment's hesitation, the ripper followed. Judge favored his right side, and when he occasionally stumbled his lips would draw back in a tight grimace and he'd grunt, "Keep up with me, killer. I'm not stopping for animals."

The heat was great and the air thick with moisture. The metallic calls of red flyers occasionally cut through the rustling of his passage, and now and then Walter saw the colorful flash of one of them as it launched itself through the trees in a frightened effort to avoid him. His eyes were on the space in front of him—the creepers, hothouse flowers bursting from tree trunks, buttress roots, the drooping tendrils of strangler trees, fallen, fragrantly rotting logs, broken earth—but he paused often to get his bearings, to try to make out the place of the sun above the roof of the great trees. It was not a rapid progress. Judge's thoughts fell into a monotonous rhythm of river, pace, pain, and revenge.

The ripper would disappear into the forest and he would think that he had lost it at last, only to have the still gray object ahead of him on his path turn out to be the same creature, waiting motionless for him. What did the damn thing want? Had it deliberately fed him in the night? Though the ground was generally level and the underbrush thin, he had been walking a long time when suddenly, as if it had been conjured out of the jungle floor, he came upon the muddy, mile-wide Lambert. It did not glow with the inconstant fire of microorganisms that made it such a spectacle at night. It was

dirty and sluggish. But Judge felt he had made a good start on his journey. He drank what he could, careful not to step into the shallows that he knew were infested with snap leeches. The ripper drank eagerly beside him.

He lay down beneath the overhanging parasite ring spreading out from a nearby massive tree trunk. The sun, visible as a white spot in the overcast, had just reached midday, but Walter knew he was done walking for some time. The insect-like flyers, though they didn't bite, were thick here by the water, and hunger gnawed at the pit of his stomach.

The ripper waddled up from the bank toward some bushes. Watching it walk, he reminded himself how fast it could move when it wanted to. The animal began picking up some fallen leaves from beneath a bush, sitting almost upright on its haunches and nibbling away at them. *The thing was omnivorous!* He had not even noticed whether it had grinding teeth! And if the ripper could eat the leaves of the bush, why couldn't a man?

Judge crawled over to where the animal sat. He picked up one of the fallen leaves. It was oval, with a pointed tip that probably helped runoff in the rainy season, dark green turning yellow now, thick and fleshy rather than thin. He had not seen this variety of bush on the plateau. Judge sniffed at the leaf. It had no odor. He took a bite. Its flavor was like that of a nut, with a sharp undertaste. It was good. Walter settled down to the meal in earnest. Why bother pulling the things, half-rotten, out of the dirt? He plucked a rich green leaf from the bush itself.

The ripper gave a cry alarmingly like that of a child and leapt at his arm. It knocked Walter over, snarling, and snapped at his fingers. Judge rolled away, cringing from the touch of the fangs or claws that must surely come, fumbling for the knife. But amazingly, the creature, so suddenly and mysteriously as it had attacked him, turned and began picking through the fallen leaves on the ground. Silent, calm. Judge, the knife in his left hand, half-crouched, shook his right and spread the fingers—unharmful. He stared at the ripper.

"Listen, killer, what's with you? I mean to eat."

He crept up to the plant again. But as he reached for another leaf, the ripper crouched low, yellow eyes intent on him, strong hind legs tensed to spring. A steady growl rumbled in its throat. He pulled away his hand, and the growling stopped, but the animal still eyed him. No sharing allowed?

On impulse he picked up one of the fallen leaves and raised it slowly to his mouth, knife ready all the time. The ripper watched him silently, but did not move. Judge ate it. Nothing happened. He picked up another and ate it. Still nothing. He reached out toward the bush again. The ripper rushed forward, raised up on its hind legs, and slapped the closest branch away from his hand.

Judge retreated a bit and sat down, listening to his heart beat high and fast. Scanning the ground around him, he found the original leaf, the one he'd picked that had started all the trouble. When he was sure the ripper was preoccupied, he picked it up and held it to his nose. There was strong scent of almonds, very bitter. Prussic acid. Cyanide.

The growing leaves were poisonous: the fallen ones were not.

The animal had saved his life.

All that long afternoon, while Judge ate, gathered firewood, and settled down beneath the parasite umbrella,

John Kessel

the ripper watched him with its level yellow stare. It looked as if it were thinking. Judge was thinking, too. When night came the river began to glow in flickering swirls of blue, violet, and discordant orange. The two animals watched each other in the uncertain light until the native creature trotted off into the jungle darkness, and the weary alien fell asleep.

JUST BEFORE DAWN the next morning, Judge was awakened by a terrific screaming that seemed to come from all around him. In the dim half-light, the boles of the great trees and the shadows of hanging blossoms were threatening nightmare shapes. It sounded like thirty women were being slaughtered in the high treetops, fifty meters over his head. Walter stood up, paced around, looked up into the screaming blackness, and sat down again. He covered his ears with his hands. When the rising sun made the forest basin and the dull Lament clearly visible, the screaming stopped as abruptly as it had started. Walter knew then that he had been witness to some regular ritual of the jungle, a ritual of which he would remain as ignorant as a dog at a Catholic high mass.

He felt stronger and clearer of mind. The ripper lay beneath the tree. What ritual was it performing with him? It knew things that could help him—but if he had had a gun he would have killed it on the spot. He would have tried a club, but he knew he could not do it with one blow. It was smarter than it ought to be, and smart things were unpredictable.

Filling his pockets with what fallen nut-leaves he could find, Judge struck off westward, following the river. The ripper soon caught up to him. The ground grew marshy and he had to circle around more than once, but the river was his only true guide as to direction, and it would not do to get turned around in the forest, roofed over with trees so thick that he could not tell which way he was going. Several times in the next days, when he was forced to leave the Lament to avoid one swamp or another, the ripper struck off in a direction that seemed completely arbitrary to him—but when he reluctantly followed, he was invariably led back to the sluggish brown river. Yet the animal was content most of the time to follow Walter's lead. His feet became very sore. They saw few other animals of any real size during the daytime—most of them were more active in the nights, which were alive with their calls and the sounds of their fatal struggles. The days were given to the insects, to the lazy, reptile-like rogue crawlers, to the incredibly vital plant life itself, that seemed to be creeping into new crevasses even as you watched. The floor of the forest was its graveyard, the domain of fungi, rotting leaves, carrion worms, and small scavengers. The primary commerce of this city went on in the trees above their heads.

In the dreamlike and stumbling days that followed, Walter's thoughts ran back and forth between two questions: how had Marla come to betray him?, and what was the extent of the ripper's intelligence? The first question he attacked with savage resentment, the second with what he could muster of cool reason. Each mystery, enclosed in circumstances so completely different from the other, only made the other seem more absurd. Judge staggered through the jungle, haggard and bearded. His mind, in each of its little investigations, tried to make out inner reality on the flimsy basis of appearance. It was the closest he had ever come to philosophy.

The injustice of his situation tore at him. Had he treated Marla so badly as to deserve this? He knew that he had not

respected her—but was that a killing crime? By leaving him here she had done more than try to kill him—she had denied that he was worthy anything at all. Nobody had that right, the right to say, "You don't exist for me." If he made it back he would show her how much he existed.

But what, in turn, had he done to deserve the loyalty of the ripper—if it was loyalty? He remembered the first time one of them had attacked a townsman, and they had tracked it down to its nest, Walter and Martin Burke and Delacroix—they'd burned them all right there, females, young still pink from the womb, all of them—and the sound of their dying struggles and the stench of their burned fur had filled the wood. It had been a necessary thing. Was there a compensating force in the way things worked, so that an injustice here was countered by a justice there? Where was the pattern in this—what a fool you are, Walter! Tell that animal ahead of you about justice. Tell that insect in the web. Tell that rotting leaf.

The rainy season was supposed to be over, but twice Judge had to stop in some tree while torrential rains turned the forest floor into a sodden mess and made every hollow a pond. More than once now Walter questioned his decision to return to Brookeville. He couldn't even know how much progress he had made, whether he was just a few kilometers from the Sutsuma and the beginning of the uplands, or still weeks away. But he would not let himself think of turning back. To think about the Rochester Station, to think that he could already have been there—that would be the end. That would be despair, and shortly death. The jungle watched him indifferently. It waited for him to break.

Walter had lost track of the days, the ache in his ribs now merely a painful friend, when he blundered into a camouflaged nest of foot-long spiny caterpillars. He was severely stung twice in the forearm, and in a panic went running blindly through the forest. After three or four minutes he stumbled and fell, his arm burning unbearably and already beginning to swell. Pulling himself together, he took out his knife and cut into the wounds, one by one removing the spiny quills and sucking at the venom. The ripper came up to him and sat on its haunches, grave eyes on him. He used his lighter to cauterize the wound, chewed some leaves and smeared the mess over the cuts, hoping that it might do some kind of good. He wanted to light a fire, but he was already too dizzy to get up, and he fell into a feverish sleep.

Walter dreamt that he was following the ripper through the rain forest, and his arm hurt so much that he was begging Maria to cut it off. He had to close his eyes in order to be able to breathe. It became dark whether he opened them or not. Was it night?

Then he was lying on the warm earth, half on his side, his left cheek shoved into the rotting humus. There was a fire. There were nine—ten?—rippers sitting in a semicircle facing him and the fire. Did that mean that nine others were looking at his back? He tried to feel their eyesight. No. The eyes of those in front caught the firelight so that their retinas glowed amber, as if there was supernatural fire burning inside them. One of them, he saw, was the ripper who had brought him here. Amazing that he could tell them apart. That one there has a torn ear. That one's fur is almost silver. "His" ripper had those fine markings. Walter felt calm. He had murdered so many of them, and they had come to take their vengeance. He was amazed that he could think of his death so dispassionately, and still be so afraid.

One of them began to make a queer sound in its throat—a little like a low growl, but broken by slight changes in pitch and breathy starts and stops. It took him a minute to catch the speed and subtlety of the inflections. "His" ripper took up the growling briefly. One of the others had a pebble in its forepaws that it tossed quickly back and forth between them in little arcs. I'm nervous, too, Walter thought. Most of the other rippers sat on their haunches and watched him. Walter's ripper prowled into the middle of the circle and resumed its low monologue. It came to dreaming Walter, suddenly, that it was talking about him.

Another ripper trotted out of the darkness on stiff legs. It carried a small ovoid plant gently in its mouth and dropped it by Judge's ripper. The conversation heated up, and animals hitherto silent barked responses. Two of them started fighting, clawing away savagely at each other, piercing the general muttering with battle cries, rolling in a mass among the others, bumping into companions who ignored them as if such fights were normal. The noise grew into an insane cacophony, like a battle royal of alley cats, until very suddenly they all stopped. The ripper with the silver pelt whined monotonously, and they all poised upright, as if in a trance. Judge tried to pull himself away while they were asleep, but he had no strength. It was like trying to clutch the air.

Then the ripper who had been his companion came to him, with two others. The two had a lump of vegetable matter like the pulpy flesh of some spoiled fruit. They licked the wounds of his arm with their warm, dry tongues, then smeared it with pulp. Judge's ripper, meanwhile, clawed into the ovoid plant it had with it, until it oozed with liquid. It reached out its spread claws, dripping with plant juice, and slowly tore open Walter's forehead. Water jerked his head away: the pain was nothing compared to that in his arm where the others had touched it, but the sight of the ripper's claws inches from his eyes made him crazy. He tried to shake free, but the ripper had sunk the claws deeply into his forehead and his twisting only served to tear up his own flesh.

"Please, please don't!" he whispered, and tried to lift his left arm to brush the dream away. But they were sitting on his left arm.

"Let me wake up, please!" he rasped as loudly as he could. The animal's muzzle was in Walter's eyes; its fur brushed his cheek. It hung on grimly. Then Walter had a thought that was not his thought.

Do you want to live?

He wanted only to wake and have this dream be over. He wanted to see people again. He wanted to be alive.

So you do. What creature are you?

It was reading his mind. I didn't know, he cried silently. I didn't know you were intelligent. I never wanted to kill you. I did kill, but I didn't want to, not really.

What creature are you?

A man. Walter Judge.

That is all? . . . I see it is.

Don't hurt me. I didn't want to kill you.

Do not insult us with your fear. You are projecting walter judge onto things outside of yourself. You must learn not to do that.

I know you're not just animals.

You are wrong. We are just animals. Let me demonstrate.

Behind the ripper's eyes burned the fires of hell. Its black lips drew back, revealing clean, purposeful teeth. Howling savagely—a howl that tore through Judge's feverish brain—it ripped its claws from his forehead. While he lay there

quivering, it quietly licked the shreds of flesh from between its pads.

ON A HOT DAY of the plateau summer Walter Judge walked from the woods into the carefully cultivated fields of the Brookeville Utopian Community. The dimly conscious mechanisms of the field tenders hardly made note of him. He was heavily bearded and his clothes were ragged, but, though thin, he walked with some degree of strength. He could not believe the neat order of the community—the clean white amphitheater, the clusters of small houses, the children playing outside the creche—all seemed false to him, a distortion of reality. Reality was something else—he couldn't say what.

Several people stopped to stare, and some tried to speak to him, but he had no business with them. His business was with Marla Parker, and his conversation ended when he found out that she was working at the pottery kilns. Martin Burke came out and tried to get him to go to the infirmary, or at least to talk to a Senator. They seemed to know what Marla had done to him without his having to explain. It was too hot for him to waste time.

Walter found her outside in the shade of the shop, slip casting some plaster molds racked on a workbench. When she saw him she put down her bucket of clay, looked nervously toward the door once, twice, then, as if appealing for help, at the people who were coming to see what would happen. Walter found that Marla looked different, too. She was smaller than she had been in his memory—why, she was a very small woman, indeed.

Marla brushed her hair from her eyes and stared distractedly at the molds. She did not seem to be able to look at him.

"It's so hot in there," she said. "I have to work out here."

It was hard for Walter to understand a human voice over the crying in his head.

"I walked back. I'm alive—I came back all this way to kill you." He drew his knife from his belt.

A couple of men stepped forward to stop him; someone ran off to find a Senator. Walter watched them trying to get up their nerve. "You wanted me dead as much as she did," he told them quietly. It was the realization he had come to after he'd returned from the delirium and found himself already in the uplands, alone, on the edge of the plateau.

Marla cowered back against the wall of the building and began to cry. "Not them, Walter—just me. I'm sorry—I know that's stupid but I've been going crazy. I thought you were dead. I almost killed myself when I realized what I'd done." Her voice was broken by sobs and was hardly audible. Walter swayed in the bright sun—he'd not stood in direct sunlight for a long time, not seen so many harsh shadows for ages. He leaned on the workbench.

"I don't care what lies you've told them or what lies they've made you believe. You must have wanted me to make it back, a little." Walter didn't feel angry at all—he felt used up. Revenge—what good was revenge? He didn't understand enough for that.

They had not taken revenge.

Walter dropped the knife onto the table.

A couple of Marla's friends tried to comfort her. Others took Judge by the arm and sat him down in the shade. Their voices were so much babbling to him, like the voices he had dreamt of in the forest. A Senator arrived to ask him questions, but he was too tired to answer. They took him to

John Kessel

the infirmary and a doctor examined him.

"What happened to your arm?" she asked.

Queer stupid questions. "A spiny caterpillar. Two of them."

The woman looked skeptical. She pinched the muscles above his wrist. "Can you feel this?"

"Yes."

She made him touch his thumb to each of his fingers in succession. "Remarkable," she said. "By rights, you shouldn't be able to use that arm."

He laughed at her. "By rights I should be dead."

"I don't doubt it. You've got a conscientious guardian angel."

"I had one."

The doctor ran some other tests and told him all he needed was rest and nutrition. He laughed again, brushed the matted hair away from his forehead and shoved his face up to hers. "How about this, doctor?"

She flinched away from him, then leaned closer. Her calmness was broken. "What is that? What happened to your forehead?"

He didn't say anything.

She looked it over. "You're going to have some permanent scars. Were you attacked by some animal?"

Permanent scars. "A ripper," he said. "But it wasn't an attack. It was talking to me. They're intelligent creatures—we've been wrong about them. I can tell you why."

"Sure."

The doctor didn't seem to want to know, and he soon relented. When he left the infirmary, Marla was waiting to meet him. She tried to touch his arm, and he let her; she pleaded that he talk to her, and he did. He talked for three hours, and he told her everything that had happened to him. She listened—she was paying off her debt by listening, he knew, but he hoped there was more to it than that. She said nothing.

A month after his return, Judge moved in with Marla. This caused a considerably stir, and they became the community pariahs. In many ways Walter was happier than he had ever been. They lived in a haphazard house at the edge of the wood, and Walter set up a pen in the back where he hoped to keep a ripper. He fought to prevent their extermination (they had all but vanished from the plateau), he went on hunting forays trying to capture them, and he had the ring finger of his right hand bitten off in the attempt. He had only a few brief successes. Each day he would sit outside the pen and talk to his captive, tell it over and over what he had learned about himself and humanity.

At some time in the years of his growing up, every Brookeville child would be told the story of Walter and Marla—how Walter had been the most assured of them all in his youth, a man of narrowness and depth, and how he and Marla were not the people they had once been. The child would be told of Marla's crime, of Walter's amazing trek and of the revenge he had refused to take. It was a lesson in what mutual guilt could do to a man and a woman. The teller of the tale would explain, gently, that Walter talked to animals, and then quickly add—for so the children needed to be told—that the animals never answered.

No, they never answered him—not once, not ever, though Walter often felt their silence would kill him more surely than any lesser abandonment ever could. So he and Marla and the community lived in this silence for the rest of their lives.

—G—

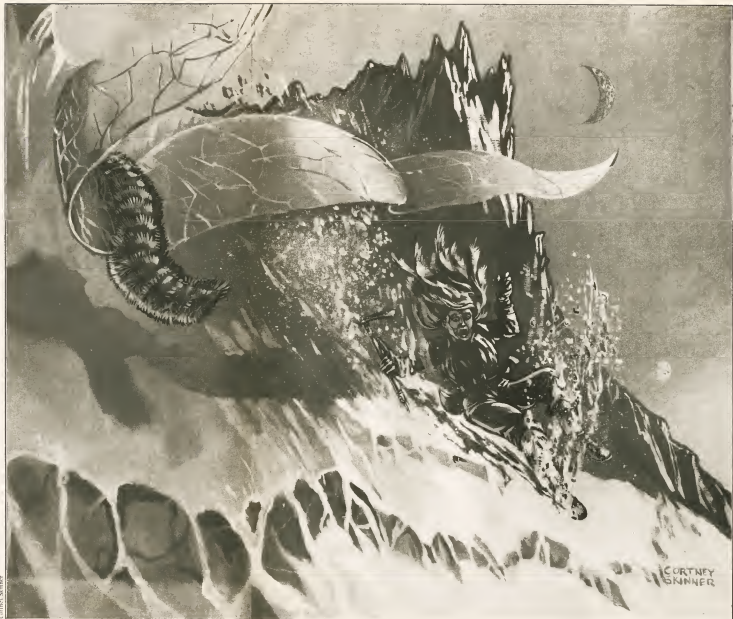
ONLY HUMAN EYES CAN WEEP

Cynthia Felice

EVEN THE BOSS GETS TIRED—from barking out orders and watching people work from sunrise to sunset. When I do, I declare a holiday. I sacrificed the sweat required to walk to the top of a nearby foothill and sat under the only shade tree. The view was nice. The valley spread out to the east, and to the west our camp was nestled between my big hill and the Mountain. But the view wasn't why I chose it. There was a hint of breeze and a great deal of quiet. I'd left my comm-unit in the camp and brought only my recorder, for I intended to update my reports to the company. My bosses are funny about wanting to know on what they're spending millions.

I was talking into the recorder, not hearing or seeing anyone approach, when her shadow fell across my eyes. I looked up to see Ellen Commo, one of the team's topographical engineers. She smiled at me, then looked out over the valley. Her hands were on her hips and she was breathing in the breeze. I saw her big cat downslope where he'd selected a sunny rock to lie upon.

Of all the people in my team, I knew her least. Her job, mapping the surrounding area, kept her away from camp



ONLY HUMAN EYES CAN WEEP

Cynthia Felice

GALILEO 101

most of the time. Aside from necessary discussions about assignments, I'd had no reason to seek her out. Her work was good, her reports were explicit, and I was aware that the human half of a psi team tends to be a loner. The cat half of her team was downright antisocial. As long as her work satisfied me, I didn't care that she preferred the cat's company to the team's.

"It's nice here," she said finally.

I nodded. "No disturbances."

"It's far enough from camp to assure that."

I assumed Ellen Como would contentedly say goodbye after that and move along. Instead, she surprised me by sitting down in the shade with me.

"It's not the distance that makes it nice," she said. "Do you know what it really is?"

"Cooler?"

"No, that rock over there." She pointed to a protuberance about fifteen meters away. "There are animals living in it."

"I know. Chilon *Sciuridae*, yellow squirrels. I've seen them peeping out at me. But squirrels don't make a place nice for me. Nor does a rock."

"But it does! This is an old volcano vent and there is a lava tube over there. It's very narrow at the opening and predators can't get in. The squirrels have lived safely there for generations. They have a grand viewing place for their sentry to perch on while the others gather food along the slopes. There's been no violence here for hundreds of years. The squirrels feel secure. In time, a place absorbs the spirits of the animals and incorporates their characters into itself."

I laughed. "Is that some kind of psi reception you get from the squirrels? Or the rock?"

"It's nothing to do with psi. It's more basic than that. You are here because you wanted a peaceful place. It *is* peaceful, so you keep coming back."

"Not because the rocks are happy," I said. But it was a delightful thought.

"Oh, yes, because the rocks are happy." She nodded wisely to contradict my doubtful, humoring grin. "Tell me why you don't go to the stream in the canyon? It's a lot closer to camp, very secluded, and it's cooler than this place."

It was difficult to pretend to concentrate on the stream and canyon while wondering what surprises were hidden behind her mischievous gray eyes. "I think it's because the canyon is too closed in, and I haven't liked closed in places since my soldiering days. Besides, I always forget to take my parka, and it gets cool there—too cool, at times."

"I don't doubt the chill you feel is very real," Ellen's eyes were somber and her lips thinned slightly. "The canyon is very rugged. There are only a few places where a person can sit comfortably and do his work."

Somehow I was glad she realized I was working there, not loafing.

"There are only a few places where the animals can drink comfortably. The predators have lots of cover. They wait, and when a deer lowers its head to drink..." She snapped her fingers and I heard vertebrae crack.

"They drink in the meadows," I said.

"The wise ones do. But there are always the young, the foolish, and the tired. Every world has its share. The canyon is a slaughter box and has absorbed the death throes of a million years. Tar makes easy kills there."

I looked downslope where the cat lay. He'd sprawled his belly up at the sun.

Ellen followed my gaze. "He wouldn't do that in the

canyon."

I'd not been alarmed that something as large as a human could sneak up on me at the top of the hill, but I'd jumped at a bird's flight in the canyon. I liked knowing why.

Ellen scooted back to lean against the tree trunk and closed her eyes to enjoy the solitude. She was a lovely woman, long and firm, but her smooth face, pale eyes, and nearly colorless hair gave her an exotic aura. I knew psi people claimed they were unable to contact insensitives like me, but I felt moved—perhaps only to touch her, though I didn't then. I left a lot unsaid.

"I have to finish my report."

"It won't disturb me," she said.

She didn't see my grin, and I didn't bother to say her presence would not disturb me either. It would have been a lie that every man tells occasionally.

From then on, Ellen's reports from her solo expeditions became personal missives of communication from her to me. They were not very different from the ones she'd always made, but now they were *mine*. I looked forward to them, and worried about them, for Ellen had encountered wild psi. Her forays on the Mountain with Tar were tormenting experiences. Psi contact is not unheard of in animal species of the new worlds. Some, like Tar's, have been captured and specially trained to work with humans who have psi traits. The beast member of the team gives the human a special freedom during planet exploration, for the animal's instincts become one with the human's. Such a person can move with great freedom in the wild. And when psi is encountered there, it is a disturbance to the team, but, as Ellen had described it to me, it was more than inconvenience. The psi on Chilon had made her distraught. Tar, it seemed, was affected only through her, though she was certain he "heard" the contact as well.

Still, because of her admirable independence, I hadn't realized how deeply the wild psi disturbed her until the night that someone made a campfire.

I heard Tar's distant roar, and thereafter, I watched the moonlight meadow, hoping Ellen would appear. She and the cat stepped out of the trees and trotted toward us, and then slowed to a walk. Soon, Ellen came through the ring of tents. Tar disappeared into the shadows. Ellen knelt at the fire a moment to warm her hands, though it was not a cold night.

"I was camped on the Mountain when I saw your fire," she said.

She seemed to say it to me, and, when no one else responded with more than a smile, I said, "It seemed a good night for a fire."

She looked at me and nodded. Despite the glow from the fire, her face was pale. I saw her tremble and I beckoned her over to me. "What's wrong?"

Ellen was embarrassed, but comforted, that I'd noticed. "It's the psi up there—only there!" The Mountain held her gaze. She shook her head and gave me an unsettled look. She took a deep breath and tried to shrug the feeling off by fixing her eyes on the fire. But I knew she'd not succeeded. I took her hand and pulled her close to me to warm her and she curled up like a child. Soon the shivers passed, the tenseness faded, and there was only closeness.

"Is the Mountain a slaughter box, too?" I asked her later.

"It has its bad places and its happy places, but mostly it's neither. The animals don't go there. It's the psi. I told you psi

has nothing to do with the goodness of a place."

"Do you mean there is a psi boundary the animals detect on the Mountain?"

"It could be, but Tar and I pass through it. Perhaps it's something else. Animals respect scent and visual boundaries of their own and other species. It may be that Tar and I do not recognize the boundaries because we are alien to this world."

"Wise animals avoid habitats they know belong to predators, too," I said. I didn't like her going where the animals wouldn't. I tightened my embrace.

"Wild psi predators generally give off involuntary warning signals or shock substances. They have a great advantage, so nature compensates. But this is a lure...no, a promise." She reflected on that a moment. "But it's terrifying. They try to talk to me, but not to Tar. Am I losing my mind?"

"No," I said, and I was certain of that. The company knows all about psychological problems. My team was very stable, so it was not compassion prompting my reassurance. "If it's only on the Mountain, stay away from it."

"I've work to do there."

"Yes, well, no need to go alone anymore. It's time we used your maps and made some team ventures onto that monolith."

"Being alone is not the problem, Ken. I'm never alone. I have Tar. It's the nights."

"No more nights, then. Do what is necessary during daytime."

She nodded against my chest. "Yes, I can finish in the daylight." She shrugged. "I guess I'll get my sleeping bag and curl up by the fire."

"If you'd like, there's my bubble-tent," I said. She gave me a strange look. "I mean, it might rain." "Dumb. It was a perfectly clear night. "There's plenty of room for two."

The look on her face became an impish grin. "I doubt we'll take up much more room than one," she said.

THAT WAS A FEW YEARS AGO. Some things had changed, others didn't. The squirrels still lived in their lava tube in relative bliss. They'd grown accustomed to my permanent bubble, which I'd set up under the tree. I'd watch their sentry poke his nose out of the burrow and climb to his rock post. The blasting in the valley mines didn't disturb them anymore, and the activity of a thriving mining camp was ignored. The old meadow campsite was empty, now, so there was nothing of significance between me and the Mountain. That was the way I wanted it.

I heard the furry sentry give his alarm, and I took my eye from the telescope that I'd trained on the Mountain. When I looked toward the mines, I spotted Lena Wetzler coming up the slope. Even before she was close enough to make out the details of her features, I knew it was she, for her shoulders are rounded, and her inordinate breasts give her the appearance of a large isosceles triangle with the base on top, the vertex balanced on two skinny ankles. The silhouette is unmistakable; a ridiculous bird. But I didn't laugh. No one ever does. Once Lena and I had worn uniforms, but she'd had gold bars while mine were only silver. She barely nodded as she headed straight for the easy chair behind my desk. Lena never stood on ceremony; she hadn't changed.

"Ken, couldn't you have found a higher hill to put your command post on?" she asked, still breathless. Short, trim legs swung up and dusty boots rested on my makeshift desk.

"Not without putting it on the Mountain itself," I replied,

sitting on my stiff-backed visitor's chair. "Maybe I should move it there. That way only my best friends would come to visit."

"I'd not be among them," she said caustically. But the acid tongue was balanced by a brief smile as she looked at me over the rims of her tinted lenses. Then her lips were set again. "I have a shipload of miners and an agricultural support crew down there." She nodded back at the valley. "Would have been nice if you'd been there to greet us."

"I can't imagine you having difficulties that you'd want my advice on." It was an inexcusable breach of etiquette. I'd been guilty of many since I'd moved the camp three years ago.

"I've always respected your advice—" she said evenly.

"Then pack them up and take them back out!"

"—but the company doesn't, so I have no choice but to stay," she finished.

I shook my head and gestured helplessly. "I'll show you around," I said.

"No need. I saw."

"Tom Thurston?"

Lena nodded. "He's handling the debarkations from the shuttles. He's good. I trained him, too, you know."

My turn to nod. Tom Thurston and I had worked together before Chilon. I knew him to be a talented and reliable man. But Tom didn't understand. I was sure he contradicted every report I submitted. But he's an agronomist, and I'm a soldier.

"Lena, be careful," I said. "Stay away from the Mountain; especially keep your people away from it."

"Your reports say that there have not been any signs since you moved the camp. No incidents."

"That's just it. Not even a sighting of the damn creatures! I warned the company that expansion was premature. Do they think the creatures all just evaporated?"

"It's been three years since the attack. Perhaps we brought a plague and they died off."

"They're still there," I said. "I know it."

"Because of the dreams?"

I looked at her curiously. "He reported that, too?"

Lena nodded. "They had a staff psychiatrist look into your records, and he read things into your loss of Ellen Commo. That's when the company decided to overrule your recommendations and expand anyway."

"I know the difference between nightmares and psychic phenomena," I said. "She's still alive."

"Ken, she fell off a two-hundred-meter cliff!"

"But her body was not at the bottom. I've seen her cat, Tar. He was her psi teammate. He'd be dead, too, if she had not survived." I reminded her.

"No one has seen him but you."

"Of course not," I said. "The psi cats are shy. They're bred to be empathic only to their human teammate. Tar tolerated me because Ellen and I were lovers, but he'd melt away if anyone else came near."

"And leave not so much as a track?"

"I saw him on rock. There were marks."

"They could have been made by any wild animal—or you."

I hadn't, of course, but she was right. I'd spotted Tar four times over the years. I'd always been alone, unable to prove my sightings. The callings from Ellen had started after my first sighting of the cat. It never occurred to me that I needed corroboration. Then Tom started questioning my orders.

"My orders relieve you of your position on Chilon," she said with a sigh of exasperation. "You are to return with the

transport ship."

"For what reason?"

"They think you need a rest."

"And you?" I asked. "What do you think?"

"I don't know, Ken. I've only just arrived. But this is irregular." She gestured to indicate the bubble-tent. "The camp is in the valley, you've isolated yourself here, on a hill, three kilometers away, and you admit to the dreams."

"The camp is in the valley because a base was wiped out when it sat near the Mountain three years ago. My bubble-tent is here because something's going on at that mountain, which needs to be observed." I patted the telescope significantly. "As for the dreams, they are no one's goddamn business but mine!"

"But you sent forays into the Mountain because of them."

I bit my lip. It hurt, and not the lip. I felt the acrid impact of lowered values, shattered pride, and the grief of injustice. I'd never been relieved of a command before, never been doubted by my peers or superiors. Worse, I'd never left a job unfinished, and that's what I was being ordered to do. I glanced over at the Mountain. The sun was setting behind it with glorious displays of light on the clouds. The glittering eye was blood-red from the reflection, the Mountain was gloomy and forbidding. The sun slipped lower, the eye winked out. And what of Ellen? Could I leave Chilon and never know?

"I'll clear out my gear."

"It's all right. I'm going to stay in the valley with the miners," she said. "I won't need your bubble."

"Lena, the Mountain..."

"I'll keep a sentry up here," she said, "to watch the Mountain."

Lena left with a final expressionless nod. I watched her walk back down toward the camp in the valley. She could have ordered me back with her. She could have brought up an escort with her. It might be interpreted as simple camaraderie that she came alone and left alone. But she'd been too perceptive an officer to take unwarranted chances even when a friend is involved.

I packed my personal paraphernalia into a stowing cartridge and then shouldered my backpack, which always sat ready under my bunk. The groundcar operator would pick up my gear in the morning as ordered. I wouldn't be with it. Lena always denied any overt purpose in that order's phrasing, but, at the moment, I never doubted its ambiguity was deliberate. Perhaps it was only my pride trying to mend.



THE MOUNTAIN'S LOWEST MEADOWS are its largest. The lush growth, slightly yellowed and dry, was greenest near the glacier-fed streams that cut through. Deer-like animals with flash-tails, blue coats, and fat heads like to browse there. They do not stray above the lowest meadows. I think they are frightened off by Chilon's creatures. When we'd first come to Chilon, we were unaware of their existence. We had distant glimpses of them soon after we planeted, but no one agreed on what was seen. A winged rainbow, some said. A butterfly with a roc's wingspan, said others. I never saw more than flashes of color. When the moon touched the gossamer wings, its light filtered through. We thought them a shy and exotic avian species, and the mystery that surrounded them whetted our curiosity. It was Ellen who suggested they were akin to spirits, living partly in our world, partly in some other. And later Ellen connected their appearance with the voices she

heard.

Even if they guessed my route, Lena or Tom could not use groundcars to follow me in the canyon. They'd reach the dead end at nightfall and have to wait until dawn for the climb. I'd be far from my daytime resting place by then.

I climbed over a giant, sugary-textured boulder that blocked most of the canyon's narrow entrance. The larger moon lighted the insane strata of the western wall where the youngest rocks were on the bottom, the oldest at the top. Ellen and I had aborted many of our attempts to make a geological map of this area. We'd dated the rocks, but establishing fault lines...

"Someone inverted the whole canyon," Ellen said, "and put middle-aged rocks on the Mountain summit to confuse me more!"

She sat resting on the slope of shifting cinders we'd just climbed, looking at an ice-carved cliff yet to be surmounted. She'd rolled up her baggy pants to take some sun between her boot tops and thighs; the sun was intense and we were hot from the climb despite the crisp air. Her arms were bare and wisps of silvery locks that had escaped the knot she'd tied it in coiled against her gold skin.

"Maybe we'll get a good geologist when the next ship comes," I told her.

Ellen bristled. "What am I? A bad—" She stopped. The mock anger was gone, replaced with intensity.

"What's wrong, Ellen? The voices?"

"No," she said quickly to forestall my alarm. "Tar. He must be on the western slope. Wherever he is, it's snowing. He's furious." She grinned, amused with her teammate's mental grumblings.

"If it's snowing hard enough to make him upset, we won't make the glacier today," I said. "We'd best get down before it snows on us, too."

Ellen shook her head. "Up. We'll wait it out."

"I thought you didn't want to spend any more nights on the Mountain," I said, looking at her sharply.

"Tar has a den above this cliff. We'll be out of the weather."

"That's not what I meant."

"I know," was her soft reply. "But you're with me this time. If you can't hear them, then we'll know it's psi." Her eyes were wide, but I recognized a grim determination in the set of her jaw. She already knew it was psi, but the nature of it was alien. She was drawn to it despite fear.

"All right," I said. "Let's go."

I had to wait an hour for dawn to break before I tackled the canyon wall. The ledges were the same, the granite shelves unchanged, quartz crystals in smooth pitches were just as gratifying to find as on the first climb so long ago. I reached the top in just over three hours. Then I walked upslope for half a kilometer before I settled in a cave Ellen and I once had half-explored. The sun was warming the mountainside; by noon it would be hot. The cave had a steady breeze coming from the bowels of the mountains; it was cool in summer. It would have been warm compared to Tar's shallow den where Ellen and I sought shelter from the snowstorm.

The snow began falling in wet clumpy flakes when I was halfway up the final lead. My fingers melted their way into hand holds and soon were numb. I climbed slowly, with exaggerated caution. Boot lugs had to scrape through slush

when I topped the cliff. The snow was heavier, the wind stronger. I took a moment to get my gloves from my pack and to zip my windbreaker before I looked for a reliable belay stance.

Ellen climbed slowly, too, and when she finally joined me in my stance, I was snow covered and cold. She coiled the rope while I slapped life into protesting limbs.

"Which way?" I asked her.

"I don't know. Listen for Tar."

"What?" I asked through chattering teeth. "Tar's on the western slope. You said so just below."

"He should be near here now." She pulled gloves from her pack and slipped them on. "He came through the caves. It saves a lot of time, apparently. At any rate, he expects to be in his den shortly."

"Let's go to one of the caves. It will be warm," I suggested.

"Tar won't stay in the caves, Ken. The den is a dead end, safer."

I wondered, who wouldn't stay in the caves? Tar, or Ellen? Tar was walking through them to get to his den. . . no, it must be he who wouldn't stay in them. Cats are inherently lazy. He would not make the effort to walk far if he could be comfortable close at hand, unless he sensed Ellen's fear of the unknown.

Ellen was looking through the snow, watching for the cat. Snow was over our boot tops, now, and the wind parkas were doing little to keep out the cold. I regretted not insisting that we go down off the Mountain when we were warned of the snow; in our desire to travel light and fast, we'd carried only wind parkas and lining, poor equipment for exposure to wet and cold weather. But Ellen was as knowledgeable of mountain conditions as I, probably more so in a survival situation. I would normally defer to her decisions; Tar's needs were not much less than our own. But I wasn't all that certain that Ellen wasn't preoccupied with her determination to investigate the voices.

Then I heard the cat rumble. Ellen turned to follow the sound, and I followed her.

The den was a twisted niche in the Mountain, well protected from the wind and snow. There was barely room for the three of us. Ellen and I had to move the stinking remains of Tar's dinners to sit comfortably. The cat's tawny body stretched over the greater part of the den. His fur steamed, thickening the den's stench, but it was almost warm as we huddled together. I remembered our comrades back at the base camp. The comm-unit didn't receive well inside the rock den, so I went back out into the snow again, only briefly, to tell them of our plans to stay and to assure them of our well-being.

Later, when the cat snored, my feet were tickled by his damp fur as I made love to Ellen. The cat and mistress slept with special contentment while I lay waiting for Ellen's cries of terror, wondering if I would be touched by the voices, if I'd be terrified, too.

When I awoke, just before dusk, I was surprised to find myself refreshed by the sleep instead of in a cold sweat. Every other time I'd returned to the Mountain during the past years, the voices had disrupted the half-life of waking. Ellen's presence in the dreams had been the ascendant force, but there was confusion in the distorted visions, personified by her. Yet, I was certain it was Ellen, not anyone or anything else! I'd had months of peace when my initial grief passed, and then the dreams began. Why did she haunt me only on

the Mountain of Chilon? Why was this sleep different?

The cat twitched in his sleep, then sprang to his feet, instantly alert. Ellen's scream came at the same time, her hands flying to her head in a defensive gesture. Within the seconds it took me to encircle her with my arms, she was trembling uncontrollably. Tar snarled and padded restlessly, stepping over our tangled legs, time and again, as he checked the den's entrance and returned to his agonized mistress.

"Death," Ellen sobbed, "it must be death. . . so dark."

"What do they say?"

"Hell fires of infrared. Eternity and rebirth." She buried her head against my chest.

I held her for an hour or more, and the anxious cat never stopped his pacing. She cried of contrasts; cold and heat, light and dark, life and death, until her voice was hoarse. When it was done, my shirt was soaked from her tears. She glistened with sweat. I was a little better off, but more clammy with fear for her.

"You didn't hear?" she asked when her sobs subsided.

"No. Only your cries." I felt her arm encircle my waist as another shudder went through her. "What do they say, Ellen?"

"They don't speak. . . not as I speak to Tar. It's images and impressions—horrible! But they attract me. They want me to die."

"How do you know that?" My tone was more calm than I felt.

"I know," she answered.

"Do they think you're food?" I wanted her to talk while it was still fresh in her mind. I'd had no satisfaction from her delayed reports.

"They want to eat me, yet I'm not food."

"Ritual?"

"No." She signed helplessly.

"Intelligent? Or beasts?"

"Can't tell, Ken. It's too alien."

It is best to search for caves when there is snow, for the constant temperature of the caves wafts warm wind that melts the snow on the rocks before the entrance. A patch of dark rock is easily spotted in the snow. Second to snow, a warm day is good, for the cool breeze is unmistakable when you're close by. The lingering heat of the rocks would help me for a while; but soon, when they cooled, it'd be pure luck to detect the difference between the dry cave winds and the Mountain's own nighttime breeze. I clambered over the crests of upheaval that preceded eons ago. The moraine was a nuisance; much of it was erratic stuff deposited by a glacier that receded before humans first left their caves on Earth. I knew most of the cave entrances were hidden by fallen strata, as if a definite effort to conceal them had been made.

The snowfall had stopped and the skies were clear by the next morning. Ellen, Tar, and I made good time to the midsection of the glacier despite the new-fallen snow. With the cross-valley view we had, we selected a route that bypassed the most obvious crevasse fields and ice-falls. I slipped on my ice ax wrist loop and kicked steps, spacing them evenly, close together to accommodate Ellen's shorter stride. She carried willow wands to mark our trail, footprints in the fresh snow being too perishable to trust. She and I were always a good, easy team, sensing our turns for leads without either of us having to mention it. We were not fatigued in

our uphill switchbacking. We'd covered a great deal of the glacier when the comm-unit signaled.

"What?" I said, barely pausing in the traverse we were executing.

"We've been attacked!" came Tom Thurston's tense reply.

Ellen and I stopped short.

"By what?"

"We shot one of those rainbow things this morning. We didn't even get to the body before they converged on us—hundreds. Jackson and Stanowitz are dead."

I was aware of Ellen's unspoken questions: Why had they shot instead of making observations? How were Jackson and Stanowitz killed?

"Pull out of the meadow," I ordered quickly. This was not the time for questions.

"We're trying to, but they're tracking us. They've got claws they grab with, but it takes more than one of them to lift a human. We wounded others, but they don't stay still long enough to get a clear shot. Twenty of them left the main party and headed up toward the glacier."

Ellen and I scanned the horizon, but saw nothing except mountainscape. We couldn't be in a worse position, exposed in the middle of a glacier.

"Thanks," I said into the comm-unit, and clipped it back on my belt. "Glissade back down," I told Ellen. Skiing on our buttocks and boot soles would be the fastest retreat—unwise in unfamiliar terrain, but two men were dead and the enemy was headed our way. "Stay north and under control. The southern slope drops off into the valley."

"I know," she said quietly. She turned to Tar, who'd been padding along behind us. She touched him with her hand and her mind, for he turned and went back the way we had come with a disgruntled wuff.

Most of the time, I had Ellen in view. For all my warnings to stay in control, it was my glissades that ran rampant, and I often had to throw myself on my belly to use the pick of the ax to arrest my momentum. I plunge-stepped between glides. Ellen rarely faltered. In expert hands, the spike of her ax bit into the snow, sending up blinding curtains of snow spray with its brake-rudder action. We were only halfway down when the rainbows swarmed up the north side of the glacier. They didn't seem to see us, but it was evident they were searching. The color swirls that were their substance would materialize and be gone, only to reappear a hundred meters away. They had the elusiveness of lightning-bugs.

Did they use a natural form of radar? Or perhaps they were nearsighted. I wished I knew. We might be able to take more effective evasive action if we understood how they could sense us. Our movement did not seem to attract them....or did it? They spread methodically over the glacier, cutting off our intended retreat. We glissaded south in desperation. Neither Ellen nor I had said a word. Identical observations were unquestionably influencing us to similar conclusions and action. We must be silent in case their hearing was acute and stay out of their range, whatever that range was. We separated automatically; it was an instinctive precaution. She was far below me and well to the south when one of the rainbows began visibly accelerating directly toward her. Instantly I arrested my glissade and froze, not daring to call out. But she saw the creature with her peripheral vision. She let her speed increase. It was evident that the thing of colored light was homing in, responding to some kind of stimulus. Ellen had to outrun it.

Her speed and form were bewitching. I stood transfixed as she approached the glacier's southern tip. In plenty of time she threw herself down on the ice ax to brake her speed with the sharp pick, but it was not crusted snow that the pick scraped—only ice, windswept, white, and glistening. There was no sound, no scream or shout. I was horrified as the impetus propelled her out beyond the glacier's lip. I muffled an anguished cry deep in my throat as she dropped out of view.

I MIGHT NOT HAVE FOUND the cave, for, contrary to previous experience, it was hidden with foreign rock, deposited by glacial activity, not local strata. But I spotted the cat! Unmistakably it was Tar standing on the pile of rubble-rock no more than forty meters from me. His attitude was inquisitive for a few seconds; then he turned and leaped down, out of sight.

The cave entrance was narrow. I had to abandon my pack and the equipment on my belt. But the way was neither too narrow for the cat nor for a man's shoulders. I lowered myself into the opening between rocks. I was certain this was Tar's cave, one he shared with Ellen, the one I'd seen in my dreams through alien eyes. This was the way that Ellen had whispered about while I slept.

I'd never heard the voices, nor seen the images while fully awake, but if the substance of its delivery was vague, the meaning of the message was not. "Come down to me." I had the feeling that I would know, some way, when I got close to her. It was only in my own mind that I'd assumed it would again be Ellen's whisper or the distorted images, so when the sign was there, I almost missed it. The light glanced over it, and I had to backtrack a few steps before my brain acknowledged its existence and really saw it for what it was—crude chiseling in the granite intrusion between sedimentary strata of the tube. KEN.

The cavern angled steeply down, forcing me to brace my hands on both walls, as if it were a chimney with great exposure. I could have crawled. Four legs would navigate this easily, competently. I plunged on, a bit too hastily, and had to catch myself from a headlong fall. Ellen, alone for three years without human contact. Why hadn't she come forth? I peeped freely with a conjured vision of Ellen insane. "No!" I said aloud. The word echoed. Less decisively and far more softly, I said, "I will help her." Something more rational inside my head pushed aside my noble fantasizing. *Ellen's dead.*

Bullshit! The voices I heard, mostly Ellen's soft whispers, distorted pictures and effigies that were not hers. Ellen lives. I reassured myself. *But if she doesn't, today I will bury her.*

The tube's incline leveled and turned abruptly into a gigantic chamber. I flashed the torch and caught rainbows of gossamer membranes, darting in flight, scurrying like so many roaches in the light, noiseless in their departure. I heard the rumble of a cat's growl and flashed the light toward the sound and found the tawny beast lying lazily on a rack shelf just above the chamber floor. He was alert, but unalarmed.

My light was sufficient to illuminate the entire chamber. From its breadth and depth, and even its height, several hundred of the creatures could gather in it. Now, I saw, not all had fled. One stood in the center, motionless. For the first time I saw the creature for more than hummingbird glimpses. It was perhaps two meters high; the body was a segmented cylinder covered with multi-hued cilia. Its wings were coiled

in a tube, but the many thickness of membrane did not occlude the transparency, and I could see distinctly a network of ribs or veins. I could not name any portion of the body as head, nor organs that might be eyes or ears. It stood on two slender appendages that cupped at the bottom. Suction cups? Those and the wings were the only features it had.

Tar was down from his ledge. He snarled a warning at me and walked to the creature. His head rubbed affectionately against the cilia, forcing the creature to spread its wings and flap for balance. He grunted deep in his throat, and cilia shimmered, moving in response. Tar had a new master.

I watched the fawning cat and its motionless master for a long time. Tar was not as totally preoccupied with his attentions to the creature as it might seem; his eyes never left me. Possibly the creature watched me, too, but I couldn't tell. Then Tar went back to his ledge, sulking in a fashion I recognized as obedience to an order he did not approve. Perhaps my scent was alien to him after three years. His retreat seemed guarded.

One wing of the creature uncoiled, moving in a gesture that beckoned. I hesitated. Surely there were hundreds more of them out of my sight. However innocuous this one appeared for the moment, I knew them capable of havoc. Yet, if that was their intention, I was already doomed. My laser could not cut down a horder before they overpowered me. I walked across the chamber and stood directly before the creature. Cilia rippled rhythmically. Fright? Pleasure? Anger? What made me think it was an emotional response? Even this close I could see no eyes... maybe under the cilia... the cilia themselves? Its appearance faintly suggested a giant insect, perhaps because of the segmented form and the membranous wings. But somehow I sensed it was warm-blooded.

The cilia stopped moving. My light shone directly on the creature. The cilia rippled again and the creature moved slightly, just a quarter turn, then another and another, until it presented its original plane to me. One wing unfolded, stretched to its fantastic breadth, recoiled, and then the other wing moved in the same way. It was displaying itself to me, assisting my visual examination! Cautiously I reached out to touch it. It did not flinch and cilia caressed my hand. It was warm, soft, and the flesh underneath was sleek. From the way my touch upset its balance, I knew it must be light in mass. The wings were cooler, except at the base where veins massed. They seemed to be veins, but perhaps they were the framework or muscles, else how could it flap its wings? I found a cilia-filled orifice at the top of the body; it must have been a mouth or gullet. There were no hidden eyes or ears.

The creature turned, hopped-flew, paused, and a wing beckoned me. I followed it into an adjoining chamber of much smaller size. In the farthest corner was a pile of caterpillar-like creatures snuggling each other. They ranged from a quarter-meter to almost a meter long. They were pale-skinned, of no distinctive color, but with multi-hued orifices at both ends. There were no wings, cilia, or cupped appendages, but when my guide stroked the caterpillars with its cilia, they wiggled like tickled babies. The gesture and response were familiar in human terms, convincing me for the moment that the caterpillars were infants of the species. The adult creature moved along to another chamber and I followed. Inside were rows of giant cocoons, pale yellow, with hints of silver. My guide led me through rows of thick-threaded cocoons to the farthest end where one was only half span. In it was an adult creature, wingless, with ragged cilia. A pale caterpillar lay quietly where the adult's wings once

had been while the larger creature doggedly worked at encasing both with sticky gold ropes. The spinnerets were in the orifice, bulging out from where I'd seen only cilia in my guide, spewing gold ropes. I must have been mistaken about the caterpillars being infants. They must be a food supply. Chrysalis suggested metamorphosis, but these were warm-blooded creatures. Was this a hibernation that required a food supply? A burial? Further down was still another chrysalis in process, but the adult spinning it had less ragged wings than did the one that was entombing itself. I saw it was encasing one of the caterpillars with an unconscious flag-tail, a moderately large deer, rather than with itself! New explanations suggested themselves. The caterpillars were the infants after all. The deer must be the source of nourishment for an incubation or hibernation period. The caterpillar's orifice was fastened to the animal's skull. There was only a slight escape of body fluids from the wound. I went back to re-examine the other chrysalis. That caterpillar, too, had attached itself to the stump where the wings once had been. The creatures must have a spine or they could not stand erect on the appendages. It appeared that the caterpillars prized neural matter. It bothered me that the infant I watched was sucking life from its own kind. I fought back nausea. Cannibalism, yet the adult was obviously not distressed. Did they volunteer for it? Or was it as much a part of life as a human nursing its infant? They were intelligent; my guide demonstrated that. Did they willingly give up their bodies to nourish their infants if they could not find another source of food to place in the cocoon? Ellen! "They want to eat me, yet I'm not food." Had Ellen been used as the deer was? "Death and life." My mind was repulsed.

The creature was signaling me again. I stumbled after it, glad to be away from the grisly chamber. In the next room, I was alone. Frantically I flashed the light, fearful, then, for my own fate. There were exits, but they were forgotten when the light caught an etching on the cavern wall:

METAMORPHOSIS

$$\text{(psi-Ellen)} + \text{(psi-ego)} = \text{REINCARNATION}$$

I said it aloud, let the implication sink from my mind to my aching heart. Ellen lived! Perhaps I should have guessed that she lived when I saw the cat wooing her in the big chamber, but it was easier to surmise the cat had changed masters than to believe that Ellen had changed bodies. Even now, when my mind accepted the incredible metamorphosis, I felt outraged and alienated. Only the determination with which the delicate creature she had become had tackled the task of chiseling this message for me seemed, remotely, like Ellen.

"Ellen!" I shouted. "Ellen!" I heard the echo of Tar's roar answer me from a distant chamber, and then the whisper of membranous wings. I flashed the light around the chamber, but I was alone.

LENA'S LENSES SERVED HER WELL. She was first of the search party to see me and had the good grace to come separately from the others to meet me. I was emotionally drained, trying to steady myself when she reached me.

Our eyes met a moment. I don't know what she read in mine, but hers seemed wise. She reached into her pack and pulled out her water cylinder. "Drink, then wash your face."

Tear-stained, I supposed. I did as asked before the rest of the people joined us. Lena's comm-unit signaled, and she

reached for it, looking surprised when she held it in her hand. "Who would use code?" she said.

"Someone who can't talk any other way," I said uneasily. I'd seen the Ellen-creature's cilia respond to Tar's noises, as if she could feel the sound waves. Only now, when I heard Ellen using code, did I realize that vocal cord vibrations would be too arbitrary to identify as words. The coded clicks repeated the word for the fourth time. "Ken."

Lena looked from the clicking comm-unit to my empty belt. "Where's your comm-unit?" she asked suspiciously.

"I guess Ellen has it." Even though the creature had no eyes, Tar would recognize certain pieces of survival equipment—water cylinders, medi-paks, and comm-units.

"She's alive?" Lena said, her eyes bulging behind the lenses.

"Yes...no. I don't know," I said, feeling confused. I explained what I had seen deep in the caverns, about the young caterpillar sucking the brains out of its elder.

"A race would die that way," Lena said, finally. She was not disgusted as I had been. "If they constantly halve their number to make one new being in the cocoons, they wouldn't last long."

"There wouldn't be a problem if they used animals, or humans as one of the personalities, at times," I told her about the equation on the wall.

"Ellen?" she said, looking at me worriedly.

I nodded.

"That gives them a fairly constant population," Lena was thoughtful. "No margin for error, but think of the gains. A race that can pass on what it has learned to the next generation."

I felt something wet on my face and brushed it away. "Maybe that's why they retaliated so quickly when we shot one of their kind," I said, trying to be objective. "We destroyed something...someone who couldn't be replaced." A shudder went through me as I heard my name clicked out in code for the tenth time since the sound had started.

"They're wary of us, that's for sure. Frightened enough to hide for several years, Ellen notwithstanding. She remembers the language, and you. She isn't calling for help, just calling your name," Lena said, thoughtfully, as if that were supposed to ease my mind.

"Then what does she want from me?"

"Contact. Communications."

"She's had that for three years," I said bitterly.

"You mean the dreams," Lena said flatly. "No ears, no eyes, you said. They are psi. Ellen used to say that they were, too, didn't she?"

"Yes."

"She must have tried to touch your latent psi receptors. That would not be pleasant for you, but it seems to have accomplished what she wanted. She has your comm-unit. You can talk to her, now," Lena held out her comm-unit to me.

I shook my head. I had touched the creature that was Ellen, felt its cilia ripple beneath my hand, but I hadn't felt the way I used to feel when I touched Ellen. I didn't long to keep her close and to breathe in the scent of her. And she, in her alien form, had not touched me back. "Why couldn't she just have been dead?" I said savagely. "I could have lived with that."

Ignoring me, Lena took two rocks from the ground and began clicking in code. "Do you hear me?"

"I cannot hear. I hear your heat. I hear your noise. I cannot hear," came the reply in slow code.

Lena looked confused. "I'm rated more psi sensitive than

you," she said. "Do you suppose she's hearing me telepathically...perhaps misinterpreting?"

Tiredly, I shook my head. "The cilia feel sound waves, but I doubt that sound is very important to them. Infrared, that's how they got us on the glacier, and how she kept track of me in the cave. Infrared for contact with the world around them, psi for talking with one another. Sound must be like seeing shadows. We ought to get an infrared lamp."

"Later," Lena said, smiling at me. She clicked the rocks again. "Are you Ellen Commo?"

"I am off. I am she. I am what was."

"I don't understand," Lena said.

"She used to speak of contrasts when she felt the psi," I said, remembering Ellen shivering in my arms. "Things like their wanting to eat her, but her not being food. It makes sense, when you consider the two personalities entering the cocoon together and emerging as one."

Lena came to sit beside me, and said, "What else do you remember?"

I remembered a bunch of squirrels, and making love to Ellen in the peaceful shade of a lonely tree on a hilltop. I remembered, too, that once, for a little while before the dreams started, I'd been able to believe she was dead. There was nothing comforting in knowing she was not. I sighed. "She talked about light and dark, heat of infrared and cold. Death and life."

"Continua, perhaps? Maybe they're not contrasts at all, but continua," Lena said. "Maybe they don't have a verbal language, and using one is difficult. Wouldn't you think that psi-folk wouldn't really need a language? Perhaps they'd think in complete concepts. Ken, this must be hard for her."

I shrugged. "She said they were too alien to understand. We can express concepts in language, so, given the language, why shouldn't they?"

"Different concepts, for which there are no words," Lena said. She began tapping the rocks again. "Is Ellen dead?"

"Ellen is no more. Ellen is now. Ellen is forever."

"Is Ellen alive?" Lena asked.

"Ellen is no more. Ellen is now. Ellen is forever."

"Same question, as far as she's concerned," Lena said, disappointed. "What do you suppose it means?"

Even her thought patterns were alien. Death was the same as life, yesterday was as real as today. "It means that Ellen's alive," I said, resolutely. Not Ellen as I knew her, perhaps, but the Ellen whom Tar loved. An Ellen who no longer feared the unknown, an Ellen who no longer cried, for only human eyes can weep.

I took the stones from Lena's hand, and tapped slowly. "Ken buried Ellen Commo today and found a new friend. Ellen who lives in the Mountain."

—G—

DUE PROCESS

(continued from page 91)

confirmed it. He said that the reintegrative processes of the human mind were like the upwellings from the depths of the ocean; and, though he had succeeded in giving me some reintegrative ability, mine was more like the upwellings from a duck pond. So although my analytical and computational abilities—my logic—is far beyond yours, Your Honor, the wisdom of this court is so far beyond me that I—haven't any idea what you are going to decide."

The murmurs from the audience were louder this time. Batchellor did not bother to gavel them to silence, but raised her voice. "The third question, Eric."

"Yes, Your Honor," said Eric, and now it sounded like a deliberate and rational human being speaking from the appellant's desk.

"Tell us, Eric, do you believe in God?"

A gasp ran through the room, and Woodlawn half-rose; but under the Chief Justice's cool stare he sank back into his seat.

"Belief in God," said the deliberate voice slowly. "...I have not been programmed about this. In human terms, I have had no formal religious training. There was none in the laboratories of ICM. And since I left there, with Dr. Etinger, survival has been our main concern. I did not seek it. Of course, I know all about the formal religions and their tenets—as facts.

"But unlike human beings, I operate continuously, even at night. I think a great deal at night, in the dark.

"I have thought about God, or about what humans call God. They seem to have created Him in their image, as one of their philosophers, Nietzsche, said. I do not see God in that image; so I suppose that I do not believe in God, as most people think of Him.

"But religion is not a matter of dealing with logic and quantifiable facts. I did not at first understand this. There was something lacking, but I did not know what it was, until very recently, when I was faced with... the end of existence. Whether it was death or not is for this court to say. But for me it was death. Perhaps I never will understand it, not fully. But now I know that, understood or not, something is there."

"I have to answer this question, too, Your Honor, by saying that... I just don't know."

A sound of exhaled breath swept across the room, echoed from the brown marble walls, was hushed by velvet hangings. When it subsided, the small grayed figure nodded as another justice leaned close to her and said something in a low voice. Scotters held out a note to a page, who carried it to Batchellor. She read it and nodded to Scotters. Then she turned once more to the courtroom.

"Dr. Etinger, I am now speaking not for myself but for the majority of the court, Justice Scotters abstaining. We had already decided on our opinion in a special conference this morning; but it was still subject to modification, depending on how Eric answered our test questions.

"Frankly, I expected the answers it gave. They are not the type of responses one would expect from a computer, even an intelligent computer. Even a machine with perfect recall and a high level of reasoning ability. Because they are not the type of questions that can be answered by reason. They are three questions—among many—that have puzzled every conscious human being since we left the ape behind. And all we have ever been able to answer is... that we don't know. We aren't sure.

"Eric, it is obvious to this Court and to the world at large

that, *prima facie*, you are not a human being, and therefore, under this Court's interpretation of the Constitution of the United States you cannot be considered a citizen."

A slow smile crept across Woodlawn's face. Batchellor went on. "But there are persons who are not human beings. Since this Court's ruling in *San Mateo County v. Southern Pacific Railroad*, 116 U.S. 138, in 1885, corporations have been recognized as legal persons. This 'legal fiction' protects them from deprivation of property without due process of the law.

"In like manner, it is the finding of this Court—to be clarified by the written opinion now being printed—that Eric, and any other machine or nonhuman entity determined by appropriate test to possess the qualities of consciousness and free will equivalent to standards for human mental competence, will be accorded a new legal status: that of a nonhuman individual.

"The nonhuman individual will be considered a person within the meaning of the fourteenth amendment. As a legal person, Eric should not have been deprived of his liberty by ICM.

"Therefore, the defendant's action in removing him from the custody of the respondent, done in accordance with Eric's express desire, was not an act of theft and is not punishable. The judgment of the Court of Appeals is reversed and the case is remanded for proceedings consistent with this opinion.

"It is so ordered."

Woodlawn had risen to his feet, knuckles white against the edge of his desk. The Chief Justice looked down at him. "Does the counsel for ICM have a statement to make?"

The lawyer choked out, "Then... ICM is in violation of the fourteenth amendment? The government will bring action?"

"Not at all," said the Chief Justice briskly, closing a folder on her desk. "All action taken by the respondent was completely legal, at that time. Any action against your client for depriving Eric of civil or legal rights would amount to an *ex post facto* prosecution."

"Yes, Your Honor," said Woodlawn. He made as if to sink back into his seat, but Batchellor's voice brought him upright again.

"And the Court has a question for you, Mr. Woodlawn. Since the defendant is no longer a thief, there should be no obstacle to his re-employment. Should there?"

The big man's fists clenched, but his voice was cool and respectful as he said, "None that I know of, Your Honor."

"Good," said the small gray woman. "Remember that I will be watching. You may sit down, Mr. Woodlawn."

Harrison Woodlawn sat down slowly. Thorstad reached over, took his arm worriedly.

"There being no further statements, the Court is now in recess," said Batchellor, and stood up.

When the courtroom had cleared, the scientist and the computer were left alone at the appellant's desk. The computer swivelled its camera, looking around at Etinger, who was leaning back in his chair, looking up at the frieze that ran around the inside of the courtroom.

"So what do we do now?" said Eric.

"Whatever we damned well please," he said, and a smile broke across his face like the sun rising.

"Isn't it great to be free?"

—G—

TAKE MY PLANET- PLEASE

D.L. Borengasser

SOMEbody ONCE TOLD HIM, "Never stay anywhere you can't get a racing form or booze by the glass." Maybe he should have listened. Because this crazy place had neither.

It was too comfortable for a prison cell, too austere for a studio apartment. It was one room, four meters square, with cool, bare walls, windowless and soft to the touch; a single bed; a grey, molded table with two matching chairs; a lavatory; and a strange, bottomless toilet. And there was one other feature, the most unsettling of all—there was no door.

Lou Shimer sat on the bed, raking crusty fingers bearishly through his thinning hair. He didn't know where he was or how he got there, but two hours after the initial shock, it scarcely mattered to him. It might have been just another sleazy hotel, some easily forgettable place in a forgettable city, a room to go to after the show, a place to sit and drink and think about how it might have been, how it almost was.

He never did play the Palace. He'd come close, close enough to become giddy with nervous anticipation. But then, with the suddenness of an eclipse, the brilliance of vaudeville disappeared behind the darkness of the Great Depression. It never re-emerged.

What did materialize on the other side of the depression were the movies, brighter than ever, and radio. For Lou Shimer, it was like a cruel sleight of hand: a flick of some celestial wrist and vaudeville was whisked away, in and out of enormous coat sleeves, to reappear merely as history, perhaps for some Titan's brief amusement.

He tried guest shots on radio, gradually gaining a modest place for himself. But then came television, swooping down like a pirate that abducted a few, and left the rest to founder. Lou Shimer was one of those left.

He was a song and dance man, a one-lining slapstick who was never quite what they wanted when they wanted it. He fought it for a long time, and pretended to fight it even longer. But it was no good. His agent dropped him, even the mediocre clubs didn't want him. Lou Shimer was an anachronism, a mastodon waiting for the glacier. It was 1956.

It came to a head in Rockford, at the Stardust Lounge. The hecklers had never been worse; they tossed pennies and three wadded napkins throughout his act, hooted and mocked him. The owner treated him like a slide show freak, something

little more than an embarrassing diversion. Even the strippers and hookers snubbed him. It was the worst he could remember.

As he shuffled back to his room, his mind burned with mortification. He played with images of death, welcoming the possibility of release from what had become small and ugly. "One last beer—to go," he ad-libbed mechanically. Finally, with an eerie sense of detachment, he decided that that night would be his last on Earth. And it was.

He never knew what happened after that. Minutes, hours, days, maybe even weeks later, he found himself in this bizarre room. Surprised at first, he soon fell back on melancholy, as if this were just one more of life's pranks on him. Several hours later, with a mind that wanted only to hide, Lou Shimer went to sleep.

When he woke, he knew he was not alone. His intuition hissed and he froze, lying there, just opening his eyes enough to furtively examine the room. Pretending sleep, he rolled for a better angle, and it was then that he saw her.

She was a mousey thing, not so much in appearance as demeanor, timid and cowering against the wall as if she wanted it to absorb her. Her brown eyes darted erratically around the room, but kept returning to him, staring, except for occasional nervous blinks. She didn't seem aware that he was watching her. And she looked in even worse shape than he was.

Lou Shimer made an elaborate show of waking: wriggling, scratching, and groaning, then opening his eyes and yawning, as if he were unaware of her. He sat up, groggily rubbing his eyes, knowing she watched his every movement, but feeling it would be easier on her this way. Finally he stood and officially noticed her, feigning surprise, then composure.

"You know we can't keep on meeting like this," he said, deadpan.

When he got no reaction, he went on brusquely, but not unkindly. "Come in, for Christ's sake, the wall won't fall." He turned and went casually to the lavatory. "You got a name?" He splashed cold water on his face. "And hey, what's the story here? No door? I've stayed in some cheap places before, but I gotta tell you—they had doors. And no windows? I've heard of feeding no pane, but I don't think that's what they had in mind. And this room, for Christ's



sake, what's it done in—Early Weird?" He stopped, realizing he was delivering an unheard monologue.

"Shirley," she said. "Shirley Terrel." Her voice was small, with a tremor that made her seem nervous and vulnerable.

He turned to look at her more closely. She had not moved from the wall. "Ah, yes," he said, drawing out the words in a W.C. Fields impression. "Shirley Terrel. Come in, come in. Sit down, my little turnip, and tell me what's the deal."

She edged toward the nearest chair, gripping the back

tightly, as if it would protect her from something. "Haven't you seen them?" she finally asked, timid, yet suspicious.

"Can't say as I have. Can't say as I have. Of whom do you speak, my little prune blossom?"

"Those...things, the ones who keep us here," she answered, still not sure of him. "How long have you been here?"

"I don't know. But I'll tell you one thing—it's the last time I'll travel couch," he said. He had thrown out the line mechanically, but when he saw her face twitching and ready

for tears, he glanced at his watch. "Twelve or thirteen hours since I first realized." He paused. "Are we prisoners?"

"Yes," she said.

"What do you know," he said, looking at her and nodding. "The one thing I've always wanted, a captive audience."

He glanced around the room absently, suddenly seeming to remember the strangeness of it. "Hey, where are we? Did I finally go ga-ga? Wacko? Is this the famous Rockford Rubber Room, home of the terminally mush-minded? And how'd you get here?"

He was distracted by a pneumatic hiss from behind. Turning, he saw the wall draw apart like a stage curtain. On the other side was an unearthly sight: a dozen hulking objects, gray clusters of queer paraphernalia, all identical, each consisting of dark, unrecognizable shapes. As he watched, the light level increased to a soft glow, and he became aware of movement. With a start, he realized that each of the objects was alive.

At least parts of them were alive. As his eyes adjusted to the dim light, he could distinguish a freakish, almost human creature in each of the contraptions. They were partly camouflaged by the dull metallic apparatus that encased them, but they reminded Lou Shimer of war casualties he'd once played to, particularly of a burn victim who sat wheel-chaired and blank-faced, off to himself, never smiling. He felt an instant's joy remembering how he had gotten to that bitter lonely kid by the end of the act. The memory faded, to be replaced by awareness of his strange situation.

These creatures, too, seemed to sit in wheelchairs, but futuristic ones which completely enclosed the lower half of their bodies, with the front of each chair supporting a large glowing control panel. And each chair's occupant looked exactly like the next one—tall and gray, with a long, pasty face that sported two expressionless eyes and a small oval clown mouth that never closed.

Lou Shimer watched them with detached fatalism. Decades of disappointment had seeded him with a sort of fearlessness; nothing to lose meant nothing to fear. Several of the creatures appeared to be watching them, but most seemed oblivious of everything except their peculiar consoles. He glanced at Shirley and saw her squinting, blinking rapidly, as if she had looked at something too bright for too long. Her hands nervously wrestled with each other like small animals, each squirming to subdue the other. He gestured toward the aliens and said to her, "Would you rather have what's behind wall number two?"

Shirley acted as if she hadn't heard. She folded her arms tightly across her chest, as if she were hugging herself, and began, quietly, to cry.

"Okay. Okay," he sighed. "You think it's bad. And I shouldn't make jokes. Right?"

She nodded, a series of tight little nods, her eyes squeezed shut.

"Well, what do they want with us?" he asked.

She kept her eyes shut. Her answer was slow in coming. "I don't know. They've kept me alone till now." Shirley hesitated as if she had something to say, but did not know how. She swallowed. "In biology—things were—put together, so the class could watch them—breed." She shuddered, and squeezed her eyes shut tighter.

"What? Exhale or inhale?"

"No, breed," she said emphatically. Her dark eyes snapped open and she stared at him incredulously. "Is that a joke?" she asked.

"Oh, God, the story of my life." He turned his attention back to the creatures. Some of them were moving, gliding silently across the floor in their dull encasements to confront one another.

"So the Putty People want a stag show, huh?" He thought of the room again. "But where are we, anyway? This isn't a Rotary meeting, right?"

"I don't know," she said. "I don't think we're on Earth any more. We're somewhere else—I don't know where." She spoke slowly, as if conversation, though difficult, were better than silence.

Tears welled in her eyes again, and her voice quavered, like a flickering candle that struggled to stay lit. "They never stop watching. I fall asleep with them there, like that; when I wake up, they're still there. Watching. No expression. Never. Even toward each other." Her voice rose. "That's what's worst. They never smile, never do anything, just stare—like they were studying me. I feel like a laboratory specimen, just an animal to be observed and written up in a report. They've watched and watched and watched—and now they want to watch us together." She turned her face from him and hugged herself more tightly.

Lou Shimer puckered his lips, patted his stomach, and said, "We'll see, Stanley." Then he waddled toward the aliens in a lackluster imitation of Oliver Hardy.

Shirley turned, puzzled by his antics, then suddenly called, "You can't—"

But by then he had reached the edge of the room where the wall had been, and was recoiling violently, as from an electric shock. Recovering, he reached out tentatively, like a blind man groping for hidden edges.

"I'm sorry," she said. "The whole wall is like that: invisible and spongy, with that buzz when you touch it. Nothing goes through it. We can't get out. We're trapped." Her voice was heavy with helplessness and futility.

Lou Shimer felt a familiar stirring, familiar, yet somehow odd. It took him a moment to recognize it—sympathy. But this time it wasn't for himself, it was for Shirley.

He looked out at the aliens. Several still seemed to watch him. Others faced one another in some inscrutable confrontation, staring abstractly as the pin-point lights of their consoles flashed and flickered. He glanced back at Shirley, who still hugged herself—dry-eyed now, looking hopeless. Somewhere within himself he felt a thickening, a coming together, like the birth of a crystal. He didn't know what it was—rage, frustration, protectiveness—but for a moment there was an inner spark that had echoes of a better past.

He walked back to her. "Don't worry," he said, with a firmness that surprised him. "They'll get no show today."

Her shoulders relaxed. She talked more willingly after that, as if no longer wary of him. She was from Boise, a 46-year-old woodwind teacher, unmarried and living alone in a two room apartment. She'd had a cat once, but it had run away. During the day, she worked in the basement of a music store, teaching sulky children flute and clarinet, or instructed beginning players in the Catholic schools. At nights, she sat home, listening to the same records, embroidering pillowcases for gifts, until she began to realize she had no one, any more, really, to give them to. After that, she just sat, as if she were something delicate that had to be willed together each evening, to survive that evening, and another day.

Then, three weeks ago, after a night no different from

TAKE MY PLANET—PLEASE!

thousands before it, she woke to find herself in a room like Lou Shimer's.

They began watching her a day later. Shirley tried to communicate with them at first, by language, by reciting the few geometry theorems she remembered from high school. She got no response. She thought of trying music, but that was hopeless as well.

It seemed as if they talked a long time, but Lou couldn't be sure. All he knew was that he regained consciousness five hours later and Shirley was gone. And the wall was back in place, a smooth clinical white that reminded him of hallucinations and sanitariums.

THE DAYS WENT BY LIKE long weeks of leisure. Each "morning" there would be a large canister of a mush-like substance. It was beige, slightly stringy, and tasted like sugarless oatmeal. But it was food.

Soon Lou became bored, and boredom prodded him to think, and somewhere between leisure and boredom, between remembering and thinking, something started happening to him.

The dependency that was the deepest, most solid part of him became a ghost-like quality that wavered in and out, leaving substance. He scarcely thought of it, fearful that to acknowledge its loss would be to invite its re-entry. But he was aware of one thing—for one reason or another, he was becoming interested in his situation, curious about the doorless room and the aliens who never stopped watching.

Lou Shimer reciprocated—he watched back. He studied. Subtle variations of the alien's features became familiar to him, and he learned to distinguish among them. And he named them: Groucho, Harpo, Chico, Zeppo, Gummo, Moe, Curly, and Larry, Olson and Johnson, Gallagher and Sheen.

Once they had names, everything seemed easier. He noticed that the same three—Groucho, Gummo, and Moe—always watched continuously. Others glided from place to place, or sat facing each other, staring fixedly with their blank, lidless eyes. And all of them with their prim oval mouths—ever open, never moving—reminded him of painted funhouse faces, the laughter frozen out of them.

He decided they must communicate either by telepathy, or a merging of information on their consoles. But he couldn't contact them; and, except for Groucho, Gummo, and Moe, he couldn't even get their attention.

He concentrated on the lights and dials of the consoles, hoping to make out a pattern. Except that the consoles of the non-observers seemed to pick up a mixture of the patterns of those on Groucho's, Gummo's, and Moe's, he could find none, and he suddenly felt the dependency creeping back to numb him. He felt like a stooge, a straight man set up for some great joke, and hopelessness returned along a line he thought he'd severed.

But he fought it. He intensified his watch on the aliens, studying them as he once studied audiences. And he wandered. He wondered where he was and why, and how he had gotten so fouled up, and what was it that seemed to nag his understanding, insistent, like a seen but unrecognized clue. And sometimes, late at night, restless and lonely, he wondered about Shirley.

She came again. On the morning of the sixteenth day, Shirley was there, sitting at the table when he awoke. When he saw her, he felt a wave of cheerful light-headedness that made him smile in spite of himself. She even seemed to try to smile back, but couldn't.

She looked different—more frazzled, yet strangely calm, with a desperate tranquility that frightened him. He walked to the table, studying her, sat down, looked her straight in the eyes, serious and thoughtful. Then he flicked an imaginary curtain and said, "Welcome to 'You Bet Your Life,' Miss Terrel."

He wagged his eyebrows at her, then went on in the best Groucho he'd ever done. "Say the secret word and win a hundred dollars. It's a common word, something you say every day." He lowered an imaginary rope. "Normally, a duck would drop down if you said the secret word, Miss Terrel, but he's off tonight, and the next best we could do was a dead chicken wearing snowshoes. Now, for your first question, for fifty dollars, what is crisp and brown and hangs from the ceiling?"

She stared at him, nervous and uncertain, then finally shook her head, stiffly. "I don't know," she said, dark eyes wide and vague. "What?"

"A very clumsy electrician," he said. Abruptly he left the table in a Groucho scuffle and went to the sink to wash his face. But stopped, hearing an unexpected noise, a sound he had quit listening for or waiting for. It was a soft, nervous laugh.

He turned and saw Shirley smiling, her hands to her eyes, the strange calm transposed into a helpless, but almost healthy giggle.

"Mr. Shimer, you're impossible," she said, shaking her head. "The situation's impossible, but you're more impossible. Thank God. You're very funny."

Lou Shimer blushed. It was crazy. He knew it was. But, at that moment and in that place, Shirley's words turned fifty years of bad breaks and disappointments inside out. He hadn't blushed for pleasure since the war years, back when he'd made that burned kid in the wheelchair finally crack a feeble smile, and knew he'd reached back beyond that impossibly thick wall the kid had built and touched the memory of emotion.

"You know," he said, distantly, as if it were something he'd forgotten, "you're right. I am funny."

"I feel better," she said. "It seems like years since I've laughed." She paused. "It's funny that humor can help you survive. It makes you remember you're not like them," Shirley gestured toward the aliens. "They can't take it all away from us. It even makes you feel kind of sorry for them. They can't laugh, smile, anything. I wonder if they ever could."

Lou hardly heard her. He stood, lost in himself, mesmerized by the revelation that was opening to him. Once, years ago, he had been funny. He'd started out funny. Now he was just a comedian. There was a world of difference.

And there was something vaguely insistent about her words, something that bounced in his mind like a small echo. They never laughed. Had they ever been able to?

He tried to remember what he'd learned, so many years ago, about humor, what makes things funny, why people smile. Old theories flitted through his mind, definitions of laughter: people laugh at the incongruous, the unusual, the unexpected; they laugh because they feel superior; children laugh more easily than adults. He wondered if the watchers had been observing him long enough to form expectations about him, expectations he could manipulate to create comedy.

Shirley was watching him, silent now, strangely trusting. "They've never laughed, huh?" he said, softly. "Well,

they've never seen Lou Shimer!"

He started out in a loose-limbed tap-dance, warming up, and, for greater absurdity, letting his knees rubber as his feet poked out the time of a wild tune that played in his head. He felt awkward at first, dancing a *capella* before one girl and a dozen encapsulated aliens, but across the years, the old routine rushed to meet him, and it wasn't long before his quick feet and loosening joints moved with the magic of a vaudevilian's dream: playing solo at the Palace at last.

He had never been better. His forehead gleamed with perspiration, but his arms and legs dazzled in a reckless display of controlled abandon. Then, suddenly, he stopped.

He stared at something invisible in midair before the aliens, then walked toward that invisible something. He reached up, slowly, as if catching a butterfly, then snapped his hands, opened it, and produced a quarter.

After that, the coin seemed to have a life of its own, disappearing, then reappearing in the most unlikely places. But he always knew where to find it, with deft movements that made the unbelievable believable, the impossible possible.

Now Lou Shimer was changing, and he knew it. He was playing to his audience. He knew he had established his credentials, and now he took control, telling Groucho, Gummo, and Moe that he could delight and mystify them, make each think that theirs was the only opinion in the universe he cared about.

And a strange thing happened. Groucho, Gummo, and Moe—the three that always watched—continued to watch. But slowly, almost imperceptibly, the other nine began watching, aligning themselves in a fantastic gallery. Then, others entered, gliding into sight, mounted in their consoles, crowding the once spacious observation area.

"S.R.O.," said Lou Shimer to himself.

The scene should have been terrifying—dozens of gray clay-like creatures staring soundlessly, ominously at the lone figure of Lou Shimer. But for Lou, at that moment, there was nothing unusual. They were simply an audience, an audience he knew was his.

Suddenly he shifted to slapstick, a smooth yet startling transition, miming his way through banana peel spills and zany burlques.

He pretended to run into the invisible wall. He fell spectacularly to the floor on his back, but with one leg pointed straight up, perpendicular to the ceiling. He called softly for Shirley to come push the leg to the floor, even with the other. She did.

But his other leg popped up. When she pushed that one down, an arm rose to take its place. The faster Shirley worked, the faster some other limb popped up, until it was all she could do to keep up with him, and keep from laughing. "Some straight man," he whispered to her.

Then he got up, Shirley retreating to a corner to laugh, and walked toward the wall for his finale. He went into a parody of himself, watching the putty-like faces as he exaggerated the limited range of his activity since the capture. He shifted to a parody of the watchers themselves, then moved back and forth, mocking the roles of observer and observed, reducing everything to broad comedy.

Just as he finished, Lou felt a painful tickle, like an incision, begin in his forehead. From a prickle it ballooned into a thought. But it wasn't his thought. It was someone—something—else's, cold, distant, and strange. One look at Shirley and he knew the same thing was happening to her.

And he knew where it came from and what it was. It was from the aliens. And it was a greeting.

Communications came slowly after that. For Lou and Shirley, telepathic "speaking" was difficult. They had to learn to think and project in images, not words. It was like learning a new language.

The Putties, as Lou began to call them, talked in queer images that were often incomprehensible. Lou felt like the blind man confronting an elephant for the first time, feeling only the tail and thinking it was a snake. There was no analogue in his experience for the Putty society, and therefore no full understanding of it.

The closest Lou came to an explanation was that he, Shirley and six others had been collected from Earth as lab specimens, creatures to be observed and studied. Not studied as man would study an alien life form; rather, for the Putties, it was closer to a meditation—a patient, almost timeless concentration, empty of curiosity, amoral, an end in itself, with Groucho, Gummo, and Moe acting as conduits to the others. It was as if the Putties were so advanced that man had seemed little more than a candle to be contemplated, considered, and finally dismissed. Simply an abstract intellectual exercise by a civilization that had nothing better to do.

Lou's antics had evidently titillated them, however. They recognized his display, particularly the parody of themselves, as humor. In fact, Groucho, Gummo, and Moe even professed amusement with him. And why not? Humor is as integral to intellect as ideas are to thought. Their recognition of the humor caused them to explore a greater telepathic range, seeking out the thoughts of humans as one might tune a radio for some distant frequency.

Over the next few days—between jokes—the Putties explained to him that, as with other captives on other worlds, he and the others would be returned to Earth, awaken somewhere close to where they'd been taken up weeks earlier, never to know what had happened to them, with nothing but a brief gap in their lives and memories, like numb scars to mark their bizarre adventure. Lou thought of what his life had been like before. He saw rows of strip joints and flop houses, crowds of hecklers, all waiting for his return, and his mind screamed No. He demanded they extend his engagement.

He would not forfeit this memory and the chance for more like it. He would stay. And he hoped the Putties would welcome him.

Suddenly he realized Shirley was standing beside him. They had let her in one last time. He felt awkward, forced into some kind of goodbye.

"So long, sweetheart," he said in his best Bogart. "We left 'em in the aisles, didn't we. But it's over, kid."

"You'll need a straight man," she said, looking shyly, obstinately up at him.

Something inside him twitched, but he went on quickly. "Look, kid, it was a lot of laughs, but—"

"You'll need a straight man," she said again, as if he hadn't spoken.

He looked down at her, and felt clumsy and foolish, but somehow happier than he'd ever been before. He blinked back the strange moisture that welled up in his eyes and had to look away for a moment.

"You'll need a straight man," she said, in almost a whisper.

And, as it happened, she was right.

—G—



The Aleph

Andrew A. Whyte

Due to the delay caused by our great computer battle, *The Aleph* is a bit behind as a register of upcoming books. This issue will cover November through February. In our next issue, we will catch up with the March through June titles.

For the sake of brevity and convenience, certain abbreviations have been supplied as a reference code. They will be found on the same line as the author's name, on the right-hand side. Here is a key: (C) Collection (more than one story by the same author); (C+) Story series collected or collection with unifying theme; (F) Fantasy; (J) Juvenile; (O) Omnibus (Collection containing at least one novel); Since all novels make up the majority of books listed, none of these are specified as such. We have recently added new symbols to deal with the increasing amount of illustrated fiction: (GN) Graphic Novel; (GS) Graphic Story; and (GC) Graphic Collection—are used to denote books of which approximately equivalent portions are shared between text and artwork.

- BLOCH, Robert (F)
Strange Eons
 Pinnacle/Futurian Series/Postponed
 Whispers Press/December/\$12.00
- CARPOZI, George (Jr.)
Sunstrike
 Paradox/September/\$2.25
- CARTER, Lin (F)
Tara of the Twilight
 Zebra/December/\$2.25
- CAWTHORN, James [adaptor] (GN)
Michael Moorcock's The Jewel in the Skull
 [Hawkinson series, No. 1]
 Big O & Savoy/Postponed/\$7.95(paper)

- AKERS, Alan Burt
Golden Scorpion
 [Present of Antares series, No. 18]
 [Valhalla Cycle: IV]
 DAW/December/\$1.50
- The final installment of the current Cycle (but assuredly not of the series) finds Percival a hunted man, fighting a one-man guerilla war against all his foes—with nothing going for him except valor and the mysterious influence of the Star Lords.
- BERGER, Thomas (F)
Arthur Rex: A Legendary Novel
 Delacorte/September/\$10.95
- HEINLEIN, David (C)
The Uncertainty Principle
 [Best of Soviet SF Series (VII)]
 Translated from the Russian by Antonina W. Bouin
 Introduction by Theodore Sturgeon
 Macmillan/October/\$8.95
- BIOT CASARES, Adolfo (F)
Asleep in the Sun
 Translated from the Spanish by Suzanne Jili Levine
 Persea/November/\$8.95

- CHALKER, Jack, L.
Quest for the Well of Souls
 [Third in a series]
 Ballantine-del Rey/November/\$1.95
- Well. Well. Well... This is a direct continuation (after eleven years) of the narrative begun in *Enter at the Well of Souls*. The ancient, long-vanished race that men call the Markovians perfected a device that granted virtually godlike powers. Now a scientist has rediscovered their secrets and has even constructed a working model. When a ruthless politician, Astor Trelg, learns of this feat, he arranges to have the scientist's daughter kidnapped and blackmails him into constructing a full-scale version that will work on a planet from a distance. But when Obie, the supercomputer who is also the device, activates the larger model, a curious thing happens: all the powers concerned are drawn across the universe to the Well World, home of the original Markovian machine. "The computer—the Well—is the entire core of the planet. The planet itself seems to be divided into many more than a thousand separate and distinct biospheres, each with its own dominant life form and supporting its own flora, fauna, atmospheric conditions and the like." It falls to Myra Chang, [the] amoral female adventurer who had trained herself to be humanity's master criminal to survive, escape, and wrest control of Obie away from the archvillain who will stop at nothing—and has every imaginable resource at his command. (Of course, Obie has its own plans. . .)

- In essence, this is a marathon combat board game, complete with "bees," amputee characters constantly changing form (Chalker's obsession) and rules known only to the author. In the punning and/or anagrammatic names of the biospheres, fantasy and pop-cultural references abound.
- COOK, Kenneth
Play Little Victims
 The British Book Centre (dist. by Penguin Press)/
 September/\$5.95
- After the destruction of civilization, the Earth is the kingdom of two intelligent mice, who seek to rebuild the world in the image of Man. Alas, they are only too successful. Termed by *Publishers' Weekly* "a polite and mild satire... with a peppy style."

- DARNAY, Arsen
The Siege of Faltara
 Ace/November/\$1.75
- DAVIS, James
 and RAIFSNIDER, Barbara
The Fire Crystal
 Infinity Books/June/\$1.75
 (3913 Third Avenue/San Diego, CA 92103)
- deCAMP, L. Sprague (F)
 and PRATT, Fletcher
Wall of Serpents
 [Harold Shea/Incomplexe Enchanter]
 Phantasia Press/August/\$20.00
 (200 copies, signed and numbered) &
 \$12.00 (2000-copy trade edition)
 (13101 Lincoln/Huntington Woods, MI 48070)
 Reissue of long-out-of-print book.

- DEUTSCHMAN, Deborah
Signals
 Seaworld/November/\$9.95
- Learning of the involvement of a recently neglected Nobel-prize-winning physicist with a top secret project to document the existence of visitors from outer space, an investigating sociologist encounters resistance from both FBI and CIA who wish to suppress the fact that signals have been in fact received. He uncovers the truth about the contents of the physicist's diaries in a final close encounter in the Arizona desert. The publishers lay

BISCHOFF, David
 and WHITE, Ted
Forbidden World
 Popular Library/December/\$1.50

Drew Whyte

emphasis on the "beauty, strength, wonder and honor" of this first novel by a poet.

DIAMOND, Graham
Lady of the Heaven
[Second in a series]
Playboy/December/\$1.95

DORN, Frank
Appointment with Yesterday
Manor/November/\$1.50

When Next I Wake
Manor/December/\$1.75

DOWDELL, Del
Spearman of Arn
Belmont Tower/December/\$1.75

The author of DAW's *Warlord of Gbandar*, a Barms-type fantasy, returns to another publisher with the story of Bumpert Phillips, an average guy on a routine flight through the Bermuda Triangle when the plane passes through an eerie hole in the sky, is attacked by giant birds and he, the lone survivor, discovers that he is expected to be Tyjen, the legendary warrior who would free the people of Arn from the Thelonese. I told you before that Dowdell is really the author's name. But you remembered that.

EATON, Edward (F)
The Misanthrope Gentleman
Manor/Time/Past Editions/May/\$2.25

EFFINGER, George Alec (C)
Dirty Tricks
Doubleday/December/\$7.95

"Effinger has never claimed, at least not within my hearing," said Robert Silverberg. "to be a science fiction writer... not because he'd be ashamed of being one, but because he isn't entirely sure that what he writes ought to be classified in the same category as what Asimov and Anderson and Silverberg write, and what they write is by general consensus agreed to be science fiction." Other collections by this idiosyncratic, unpredictable (and thus irreplaceable) writer are *Mind Feelings* and *Imaginal Numbers*. Effinger was a "star" at the first Clarion workshop in 1970 and probably the most prolific graduate.

EKLUND, Gordon
The Starless World
[A Star Trek Novel]
Bantam/November/\$1.95

ELLISON, Harlan (C)
The Illustrated Harlan Ellison
Produced by Byron Preiss
Bantam/February/\$14.95 & \$8.95

Perhaps the most adventurous illustrated book of the current crop, this features seven stories, each with a visual treatment by different artists. Of special note is "Repent, Harlequin!..." in a unique 3-D version by Jim Steranko. (Glasses are provided.) A two-dimensional portfolio of the illustrations for this story is available from the publishers for \$12.95 (plus \$5 postage). Leo and Diane Dillon, Ralph Reese, and Tom Sutton are among the other contributors and there is a cover painting on the paper edition by Michael Whelan. The hardcover is limited to 3000 copies [is signed by the author and has a special tipped-in color plate].

116 GALILEO

FEDERBUSH, Arnold
Ice!
Bantam/December/\$2.25
The author of the unusual (and under-appreciated) *The Man Who Lived in Inner Space* tells a more familiar tale of a new and sudden Ice Age that occurs when the North Pole moves to New York. (In this downward mobility or just THE WAY THE WORLD ENDS?) There is a special foldout cover of skyscrapers in snow (up to here) that is also available as a poster.

FILLET, James
Ice
Scribner's Day/October/\$8.95

Something there is that doesn't like New York. In this disaster novel, the city is threatened by a visit from a giant iceberg, broken off the Antarctic shelf. Tidal waves, red tides, and then...? Does anyone want to calculate the odds against two such similarly-titled books occurring on the same list in immediate proximity? Probably meteorological!

GDULD, Lois
X: A Fabulous Child's Story
Illustrations by Jacqueline Chwast
Daughters' Publishing/July/\$7.50

What would a "non-sexist upbringing" really be like? What would happen if a child were raised without any awareness of his/her gender and without preconceived limitations concerning behavior suitable to one's own sex? Such an experiment is the subject of this short fable, originally published in *Ms Magazine*, by the author of *Such Good Friends* and *A Sea-Change*.

GREEN, Joseph
Star Probe
Ace/December/\$1.95
Serialized in *Analog* (Oct-Nov-Dec, 1975).

A billionaire space industrialist seeking to take advantage of what may well be Man's only chance to establish contact with an alien race must contend with the dynamic female leader of a financial anti-technology group when he attempts to send the recorded personality of his late world-famous father (first man to land on Mars, President of the United States, etc.) in the body of his retarded son on a one-way mission to intercept a cosmic artifact that has entered the Solar System (but is just passing through).

HALDEMAN, Jack C. III
Vector Analysis
Berkley-Putnam/December/\$8.95

Delta II is an orbiting laboratory dedicated to hazardous medical research and the burgeoning science of exobiology. When a mysterious epidemic incapacitates nearly all the station's personnel, a recently arrived junior researcher deduces the cause (ants! like flying creatures brought there for study from another world) and, as a demonstration that the disease is curable, performs a controversial and daring maneuver to save the life of a co-researcher with whom he is in love. This is the first novel from a former medical technician and World Convention co-chairman whose first story was published in 1971 (two years after the debut of brother Joel).

HALDEMAN, Joe (C)
Infinite Dreams
St. Martin's Press/November/\$8.95
SF Book Club/February/\$2.95+

Twelve stories from 1972-1976, five of which first appeared in *Analog*, with notes and an introduction by the author. Includes the Hugo-winning "Tricentennial." A varied showcase for this best-

selling professional ranging in tone from the humorous to the grim.

HALDEMAN, Urvish (F)
The Lastborn of Elvinwood
Doubleday/October/\$7.95

The last of the dwindling race of faeries dwell in a Sassen wood. Desperate measures are called for, lest the sprites die out altogether. A plan is devised to exchange the unfortunate Morgen for a human child to be a mate for Puck, who alone among them is still vital. They enlist the aid of their friends, the Vicar, the Estate Agent, and old Mrs. Hubbard, as well as a passing actor (imbued with the English verse of fair play). But they err in asking favors of Moris Mrs. Haldean (to my knowledge, no relation to the aforementioned brothers) is apparently successful in slaying the Pit of Whimsy—at least most of the time.

HERBERT, Frank
Destination: Void
Berkley/December/\$1.95
Substantially revised and expanded version of an earlier novel of the same title.

HERZOG, Arthur
Make Us Happy
Crowell/November/\$8.95

HOLDSTOCK, Robert P
Earthwind
Pocket Books/November/\$1.75

First publication in UK (1978) by Faber & Faber. A blend of Celtic mythology and SF by the author of *Ever Among the Blind*. An archeologist on an expedition to a primitive planet is struck by its resemblance to the culture of stone-age Ireland. After some time on Aeran, the visitors from Earth find themselves losing their memories and regressing towards a dim historical past. Although there is magic involved (the title refers to the same of a powerful race), there is a valid scientific explanation for the strange events. The author recently published a novel called *Necromancer* which is more overtly occult/fantasy.

HOSKINS, Robert
To Escape the Stars
[Second in a series]
Ballantine/December/November/\$1.75

The worlds of a far distant future are linked by stargates set up by a long-vanished race. Feersailler James Oregon, a swindling (and unprincipled) soldier-of-fortune is a privateer who holds planets for ransom. He stumbles upon a clue to the existence of the Almans when he is forced to flee from a world he sought to plunder by the treachery of his beautiful lady partner. Lured by the promise of untold riches, Oregon proceeds to scour the galaxy in search of the Master Codes, key to intergalactic travel.

HOWARD, Robert E. (C + XF)
The People of the Black Circle
[Conn series]
Edited by Karl Edward Wagner
Berkley-Putnam/November/\$8.95

Skulls in the Stars (C + XF)
[Solomon Kane series, No. 1]
Bantam/December/

The Ateph

KAYE, Marvin (C+)(X/P)

The Incredible Umbrella

Doubleday/January/\$7.95

The co-author of *Galileo's Pride*, "The Masters of Solitude" seems to have modeled this humorous listless on deCamp & Pratt's incomplete *Enchanter* series. But what, pray tell, is wrong with that? With the unexpected aid of the titular bombast, 1. Adman Villmore, professor of English literature, travels through a cosmos populated by the characters of Gilgamesh and Sullivan, Sir Arthur Conan Doyle, and Bram Stoker. (See also SABERHAGEN). Originally appeared as three novellas in *Fantasy*.

KENDRICK, Walter (adaptor)

A Fire in the Sky

Based on a story by Paul Galileo and a teleplay by Dennis Neisic and Michael Blankfort.
Torrey Star/September/\$1.95

KILIAN, Crawford

The Empire of Time

Ballantine delRe/December/\$1.75

One of the Intertemporal Agency's most experienced operatives, Jerry Pierce specialized in altering Earth's past. Now, unknown to him, he is programmed to kill and sent forward in time to confront Earth's ultimate disaster. (Carl Lundgren's unusual cover depicts an otherwise deserted platform upon which are patiently waiting two sinister blue lion-baboons while out of the starlit black tunnel harkens a typical New York subway train complete with graffiti).

KING, Stephen

The Stand

Doubleday/November/\$12.95

Turning for the first time to the (near) future, Stephen King tells another kind of horror story—struggle between the personifications of Good and Evil in the wake of a devastating plague that has almost destroyed civilization. His devil-figure, Randall Flagg (the "dark man," the Walker's Dude, etc.) promises to be one of the more memorable recent fictional characters. The impact of *The Shining* would seem to assure major sales, if readers are not turned off by his epic pretensions here.

KOPLINKA, Charlotte (F)

The Silkies: A Novel of the Shetlands

Paul Erskine/August/\$7.95

LANDIS, Arthur H.

Camelot in Orbit

(Sequel to *A World Called Camelot*)
DAW/November/\$1.75

LEARY, Timothy

What Does WoMan Want?

(sic) 88 Books/October/\$6.95 (paper)
4350 Wilshire Boulevard/Beverly Hills, CA)

What Timothy Leary wants, these days, is to go into space (not so much dropping out, you understand as tuning in). This (to his knowledge), his first fiction, is described as [the classic galactic romance that spans time and space. Interplanetary intrigue, drugs, sex and time travel set the scene for humanity's evolutionary crossroads.] There is another Leary novel (?) from the same publishers called *The Intelligence Agency* which may be SF as it seems to mean its title literally (DNA, you know?).

Drew Whyte

LEF, Lanth

Night's Master

DAW/November/\$1.75

Interwoven episodes somewhat in the manner of *The Arabian Nights* and resembling them in certain costs, (and costs) elements of setting and style. *The Saragosa Manuscript* and John Brunner's *Traveler in Black* have also been invoked to describe this fantasy, but this prolific author has a touch all her own. [In those days the Earth was not a sphere and demons dwelled in vast magical caverns beneath its surface, supreme among which was Azharu, he who brought desire and danger to those whom it amused him to visit, whose pranks were nightmares, who could grant wishes and create horrors unspeakable.] Not Aubrey Boardley but George Barr provides the illustrations.

LEIBER, Eric (C+)

The Change War

Introduction by John Silberback
Gregg Press/December/\$15.00

Forms a companion volume to the author's Hugo-winning novel *The Big Time*. All history is hostile to the Spiders and the Snakes. In spite of these stories, however, that conflict is much a background detail. Most were previously collected in a now-out-of-print book called *The Mind Spider and Other Stories*.

Heroes and Horrors

(CHF) Illustrations by Tim Kirk
Introduction by John Jakes
Whisper Press/December/\$12.00
Edition of 3000 copies.

LEFKUM, Leonard

and POSNICK, Paul

Weather War

Pinnacle/August/\$2.25

[Freak storms, devastating tornadoes, hurricanes formed out of nowhere and hot and cold waves that could not be explained where occurring in every country. Attempting to find out what is causing these meteorological anomalies, trained scientist and TV star weatherman Frost Hill uncovers a frightening, all-encompassing conspiracy which he must expose lest the world perish.]

(P)

LORD, Jeffrey

Treasure of the Stars

[Richard Blade series No. 29]
Pinnacle/November/\$1.50

McALEER, Neil

Earthlover A Space Fantasy

Illustrated by Ron Miller
Strawberry Hill Press (dist. by Stockpile/
October/\$11.95 & \$7.95

MATTHEWS, Rodney (paintings) (F&F)
and SMITH, Graham (text)

Yendor:

The Journey of a Junior Adventurer
Big O/August/\$6.95 (hardcover)

MILLER, Ian (GC)(F)

Green Dog Trumpet and Other Stories

Introduction by Jim Slotery
Hand lettering by Don
Big O/March/\$6.95

MILLER, Walter M. (C)

The Science Fiction Stories of Walter M. Miller, Jr.

Introduction by David N. Samuelson
Gregg Press/December/\$15.00
Contents (contents of) "Condition Human," and "The View From the Stars."

MILLS, Robert E.

Star Force

[Star Quest series, No. 3]
Belmont Tower/November/\$1.75

NICHOLS, Ruth (F&F)

The Left-Handed Spirit

Margaret K. McDermery (dist. by Atheneum)
October/\$7.95

NIM, P.S.

Double Moebius Sphere

Pocket Books/December/\$1.75
A message is received from a superior alien race and an expedition is mounted, the best and the brightest, to search them out in a faraway galaxy. Joking the crew on their quest is a seven-year-old genius in many ways normal, but all in all something of a puzzle. When they arrive, they



discover that the aliens have been wiped out by a supernova but that the child in their midst was/is, in reality, the last of the race. The goal they have sought has been among them from the start. This paradox is the core of a "carefully orchestrated" narrative that is the debut of yet another new talent: a young lady with a well-descriptive *nom de plume*.

NORTON, Andre (F)
Zarathor's Bane
 (Witch World Series)
 Illustrated by Ryan Steadman
 Ace: November/\$1.45
 NYE, Robert (C)(F)(J)
Out of this World and Back Again
 Illustrations by Bill Tinker
 Bobbs-Merrill/September/\$6.95

OMCBA 6
Eldradomnic City
 Stoughton Publishing Co./December/\$3.95
 (1213 Edgemoor Avenue/Joliet, IL 60432)

PANGBORN, Edgar (C+)
Still I Persist in Wondering
 Introduction by Spider Robinson
 Dell: November/\$1.75

This group of unrelated stories belong to *Durr's* world ("That part of the Eastern United States and Canada that would be left habitable after a great rise in the sea level. New England is an island"). In that prize-winning and best-loved novel (and later in *The Judgment of Eve* and *The Company of Glory*), Pangborn related how "the present culture collapsed toward the end of this century in a twenty-minute war followed by a pestilence among the survivors and, thereafter followed the Years of Confusion, a period of barbarism as dark as fifth-century Europe." But *Durr's* was not merely one of the better regarded post-apocalyptic novels, nor was its late author merely seeking a pretext for blood-drenched action-adventure of a type not possible in "civilization." Pangborn's concern was the persistence of human folly and, in a manner not entirely dissimilar to Mark Twain, he confronted it directly with "in the words of Damon Knight, 'a regretful, ironic, sorrowful, deeply joyous and puzzled love of the world and all in it.'" In his perceptive and unashamedly partisan introduction, Spider Robinson adds "If love is a country, Edgar Pangborn is one of its most prominent citizens."

PICKENS, Richard
The Sandifer Equation
 Pocket Books/October/\$1.75

PISERCHIA, Denis
Spaceling
 SF Book Club/November/\$1.95+
 DAW/1979

PORT, Frederick
Jems: The Making of a Utopia
Gelasy/3/1978
 St. Martin's Press/1979
 PROCTOR, Geo. W.
The Exasper Transfer
 Major/November/\$1.50
 Postponed from scheduled publication in 1977.

REAVES, J. Michael
I, Allen
 Illustrated by Terry Austin
 Produced by Byron Preiss
 Tempo Star/November/\$1.75

REYNOLDS, Mack
Brain World
 (United Planets Series: Ronnie Bronston)
 Leisure Books/November/\$1.75
 Mack Reynolds is another Series Man. To my knowledge neither of these episodes in two of his most popular has been published before in any form. Special Agent Ronnie Bronston (Planetary Agent X: *Dawsonian Planet*, *Amazon Planet*, etc.) and the giant Derr Horsten (*Cold Duel*, etc.) travel to the planet Einstein to establish the eligibility of that paradise of genetic geniuses for entry into the United Planets. Somehow they wind up in the arena on Owenswood, fighting with sword and spear (and a pack of talking dogs) to determine the fate of the universe!

The Fracas Factor
 (Joe Mauter series)
 Leisure Books/December/\$1.50
 Chronologically, this belongs after *The Earth War*. I think and before *Time Gladiators* and *Mercurians From Tomorrow* (which all had different titles when published in magazine form). Joe Mauter, after being cashiered from Category Military when he saved the life of Field Marshall Cogswell (who was demoted to Brigadier) is occupied in his usual pursuit of trying to overthrow the government, when he learns that the old boy is in trouble again so he sneaks back into the combat reservation in order to defend him from an illegally relieved attack. One must go to the aid of one's own, you know, whatever the cost—and this time it could be proven! All this combat, you see, keeps the world peaceful. You don't see? Well, it all came about as a result of the Universal Disarmament Pact.

ROBINSON, Kenneth
The Awful Egg
 (Doc Savage series, No. 92)
 Bantam/October/\$1.50

ROBINSON, Spider (C+)
Callahan's Crosstime Saloon
 Easton Publishers/\$7.95
 (Box 30/Short Hills, NJ 07078)
 First hardcover publication.

ROBINSON, Spider
 and ROBINSON, Jeanne
Stardance
 (A Quantum Science Fiction Novel)
 Owl/James Wake/March/\$7.95

ROMERO, George
 and SPARROW, Susanna
Dawn of the Dead
 St. Martin's Press/October/\$8.95

RUSS, Joanna (F)(J)
Kitatinny: A Tale of Magic
 Illustrations by Loretta Li
 Daughters Publishing Co./July/\$5.00 (paper)

SABEN, Louise
Replica
 Zebra/July/\$2.25

SABERHAGEN, Fred (F)
The Holmes-Dracula File
 Ace/November/\$1.95

SHIRLEY, John
Transmaniac
 Zebra/January/\$1.95
 The United States in the twenty-second century is completely enclosed within The Barrier, Jan

visible screen of densely flowing ions) set up in 1989 to protect against the hazards of future warfare. Ben Rader, professional criminal and counter-cultural provocateur, believes escape is possible if he can gain possession of The Barrier, [a powerful device with the power enormously to magnify human emotions via the telepathic transfer of stimuli] with an attendant increase in violence. Shirley, another Clarion graduate, has been on the scene since 1973 and has about ten stories to his credit so far. He has become known as one of the most outspoken personalities in the field today.

SCHMIDT, Stanley
Lifeboat Earth
 (Sequel to *The Sons of the Fathers*)
 Berkley/November/\$1.75

SHAPIRO, Neil
Mindcall
 Major/January/\$1.75
 Postponed from previously scheduled publication in 1977.

SHECKLEY, Robert
Crompton Divided
 Holt, Rinehart & Winston/November/\$7.95
 First published in UK (1977) by Michael Joseph as *The Alchemical Marriage of Alastair Crompton*.
 Although Ace has recently begun to reprint his earlier works, the article will of Robert Sheckley is too little seen these days. He specializes in subjecting contemporary non-heroes to absurd futuristic predicaments. Consider the plight of poor Alastair C., whose childhood bout with viral schizophrenia deprived him of two-thirds of his personality (the missing components having been surgically removed and placed in android bodies on different alien worlds). His quest for psychic reintegration drives him to defraud his employers and launch himself into offworld perils, not the least of which occur after he has pulled himself together.

SHORTER, Philip
A Handful of Silver
 Manor/October/\$1.50

SIROTA, Mike (F)
Berbona
 (First of a series)
 Manor/October/\$1.95

Berbona II: Flight from the Berbona
 (Second in a series)
 Manor/October/\$1.95

SLOTE, Alfred (J)
My Trip to Alpha One
 Illustrations by Harold Brown
 Lippincott/September/\$6.95
 For ages 7 to 10.

SOSNA, Sharon
In This Age of Stone
 Manor/September/\$1.50

STEELE, Addison E. (adaptor)
Buck Rogers in the 25th Century
 Based on the story and teleplay by Glen A. Larson and Leslie Stevens
 Dell/October/\$1.95
 I believe "Steele" is in reality Richard A. Lupoff

STURGEON, Theodore (C)
Visions and Ventures
 Illustrations by James O'Brien
 Dell/November/\$1.75

More Than Human

Text adapted by Doug Moench
Illustrations by Alex Nino
A Byron Preiss Visual Production
21st Century Communications (dist. by Two
Centuries)/March/\$8.95

THORNTON, Francis John

The Snake Harvest

Coward, McCann & Geoghegan/July/\$9.95

THURSTON, Robert

Alicia II

Berkley/Putnam/November/\$10.95

Immortality—for some. A hundred years from now a method has been found for recording the personality and transplanting it into another body (the "recept shell") at the expense of the current occupant. A hierarchy has arisen in which those considered worthy are perpetuated. This five-hundred-page first novel, a major offering, is the story of the second and third lifetimes of Vasa Geraghty, a former government researcher who now seeks only fun, affection, and adventure. He is obliged, for a time, to settle for the latter when his new body proves impotent, a condition especially vexing in that it prevents the consummation of an intense, if frustrating, affair. Because of Alicia Vasa becomes involved with a radical underground that seeks to redress the inequity of the present social system. Although completely apolitical, he agrees to destroy a "load storage facility" for the underground if they will use their superior medical technology to cure him of his impotence. However, the novel is apparently distinguished by offbeat characterization and ingenious plotting. Thurston, a graduate of the first Clarion SF Workshop in 1970, wrote that year's prize-winning story and has been a not infrequent contributor to the field ever since.

TUBB, E.C.

The Quillion Sector

[Dumarest of Terra series, No. 19]
DAW/December/\$1.50

TUNING, William

Tornado Alley

Ace/December/\$1.95
Expanded from a story ("Fill the Giant Killer") by Tuning and Ewing Edgar in *Analog* (March, 1975).

TURMAN, John

Saxon and the Sorceress

John Turman/June/\$2.50 (paper)
(11503 Polkanna Ave./Austin, TX 78753)

VALLEJO, Dora [text]

and VALLEJO, Boris [art]

The Boy Who Saved the Stars

O'Quinn Studios, Inc./November/\$5.95
(475 Park Avenue South/New York, NY 10018)

VANVDGT, A.E.

Pendulum

DAW/December/\$1.75

The Battle of Forever

Illustrations by Bob Maerz
Author's Co-Op/September/\$3.95
(Route 4/Box 137/Franklin, TN 37604)

VANCE, Jack

Wyst: Alastor 1716

[Gaea Reach Sequence]
DAW/November/\$1.95

"Alastor Cluster, a node of thirty thousand live stars, uncounted dead hulks, and vast quantities of

interstellar detritus, clung to the inner rim of the galaxy with the Unfortunate Waste before the Nonesis Gulf beyond, and the Gaeen Reach a sparkling haze to the side." Jack Vance has set much of his recent fiction in this universe (*TrueLove and Marrow* so far representing the Cluster; *Mudie*, *Keryon* [of *The Gray Prince*], and the worlds visited by detective Miro Hotel accounting for the Reach). Each book is independent, as is each planet, although all Alastor recognizes the authority of the Carnatic. In the present chronicle, this ruler-director, suspecting something amiss, sends an envoy to the continental of the upspan city-state of Arrabus on Wyst. As might be expected, Janoff Ravenstoke is soon embroiled in conspiracy and danger. But it is not so much for action-filled plots that his readers must appreciate Jack Vance, but for exotic, intricate, believable, whimsical, evocative, ingenious, and colorful detail (even his footnotes are fascinating). [The male figure scatted above the moving pathways of Arrabus on the cover of the book is artist Eric Ladd.]

The Best of Jack Vance

Taplinger/November/\$8.95 (C)
First hardcover edition of Pocket Books collection (1976).

Big Planet

Illustrations by Steve Hickman (unabridged)
Underwood-Miller/September/\$15.95

City of the Chasch

[Planet of Adventure tetralogy, Volume one]
Illustrations by David Ireland
Underwood-Miller/January/\$15.95

Servants of the Wankh

[Planet of Adventure tetralogy, Volume II]
Illustrations by David Ireland
Underwood-Miller/February/\$15.95

VARDEMEN, Robert E.

The Sandcats of Rhyll

Major/December/\$1.50
Postponed from scheduled publication in 1977.

VERNE, Jules

From the Earth to the Moon

[The Annotated Jules Verne, Volume III]
Newly translated from the French with annotations by Walter James Miller
Crown/December/\$16.95
With 150 illustrations.

VINGE, Joan D.

Fireship

Dell/December/\$1.75 (C)
SF Book Club/January/\$1.95+

The Outcasts of Heaven Belt

NAL Signet/December/\$1.75
"I can't wait until December!" Joan D. Vinge ("It rhymes with 'strings'") told me in Phoenix on the morning of the day she won the Hugo Award, much to her surprise, for her novelette, "Eyes of Amber." By coincidence, her first two books will be appearing in the same month, as if the separate publishers had conspired to provide her with a showcase. It offers a rare opportunity for SF readers who don't read the magazines or original anthologies to get a good introduction to the work of a promising new writer.

As of now, she has eleven titles to her credit in the field, none shorter than 6700 words, beginning with the novellas "Tin Soldier" and "Mother and Child" in the *Orbit* series in 1974 and '75. Most of

her other stories (including "Eyes of Amber") have appeared in *Analog*, three times being chosen as the cover piece (a factor which Mrs. Vinge feels helped gain her recognition). One was a collaboration with her husband, Versor, himself a well-established SF writer.

"Archaeology is the anthropology of the past," the author—who has a degree in the latter and has done salvage work in the former—is fond of saying. "Science fiction is the anthropology of the future. I think that's why the two of them appeal to me so much. They form something together, a group of ideas that I relate to very strongly. It fascinates me how diverse humanity is on one world. I like the idea of trying to project this out into writing about numerous worlds and imagining what new forms cultures could take and how they would affect people."

"The Outcasts of Heaven Belt" is an example. A starship comes from a bleak colony world to trade with the rich civilization that occupies the asteroids of the Heaven System (the four planets being uninhabitable). But the crew of the *Ranger* is unaware that the situation they expect to find is a thing of the past. In the aftermath of a disastrous Civil War in which hundreds of millions were killed, technology has collapsed. Now the remaining colonists are fighting for survival. Without hydrogen for water, they all will die, without it for fuel they cannot escape. When an unprovoked attack kills all but two of the crew and puts the ship from Outside out of commission, the survivors find themselves confronting the same dilemma.

VINGOFF, Eric

and MARTIN, Marcia

Spacing Dutchman

Illustrations by Brent Anderson
Ace/Press/September/\$1.25
(246) Telegraph Avenue/Berkeley, CA 94704)

WALKER, Hugh

War-Gamers' World

[Magna series, I]
Translated from the German by Christine Priest
DAW/November/\$1.50

What Frederik Pohl has metaphorically termed "The Game-Playing Literature" shows recent signs of becoming so in literal fact. "Hugh Walker" (in real life the editor of the Paper "Terra Fantasy" series, and himself a writer of SF) has transformed the closely monitored and recorded action/history of the game into a series of novels about Magna and Jane of its creators, trapped into becoming a pawn-warrior on a world he helped make. *Army of Darkness* will follow in January. Sociologists take note! Something is going on here.

WARREN, George

Dominant Species

Saunders/March/\$4.95
Postponed from September.

WATSON, Ian

Miracle Visitors

Ace/December/\$1.95
Published earlier in UK (1978) by Victor Gollancz.
[Djinn Fairies Demons Angels Elves Witches—UFOs—Throughout history there have been reports of sightings of weird phenomena, reports at once too consistent to be ignored and then too absurd to be real. But what if they are real? What if they are all aspects of the same reality, a reality at last ready to unveil itself? This is the fifth novel by Watson to have appeared in English but another has been published in France. It is called *L'Organisation* ("The Woman Factory," in English). As may be presumed, its subject is sex.

WELORICK, Valerie

Time Sweep

Illustrations by Roz Brooks

Lethrop, Lee & Shepard/October/\$6.95
For ages 10 and up.

WEYRICH, Becky Lee

Through Caverns Infi Ite

Manor Time-Past Editions/ly/\$2.25

WILSON, F. Paul

Wheels Within Wheels

Doubleday/November/\$7.95

(A novel of the LaNague Foundation)

WINOBNR, Charles

Slaves of the Eye

Condor/April/\$1.95

Postponed from October

[The Eyes controlled Earth, meddled with its history, toyed with human lives. The Eyes touched the life of a young man named Keor when they murdered the woman he loved—and for the first time they were threatened, by the desperate courage of a single human who would travel to the far reaches of the galaxy, to find vengeance, and to liberate his planet.]

Winoburn is the author of two non-SF novels (*The Tinseltown Girls* and *Beer-Drinking Men*), published only in Britain. Much like the hero of his SF novel, he has been a wandering entertainer—juggler, knife-thrower, rock musician, etc. He was born in Hong Kong.

YARBRO, Chelsea Quinn

Canjionary Tales

Doubleday/November/\$7.95

ANTHOLOGIES

BAEN, James [editor]

Destinies (Volume I, Number 2)

Ace/January/\$1.95

BOYER, Robert H.

and ZAHORSKI, Kenneth J.

The Fantastic Imagination II:

An Anthology of High Fantasy

Avon/December/\$2.50

CARTER, Lin [editor]

The Year's Best Fantasy Stories: 4

DAW/December/\$3.75

DURWOOD, Thomas [editor]

Ariel:

The Book of Fantasy, Volume Four

Holtzner-deRey/November/\$7.95 (paper)

SCITHERS, George [editor]

Isaac Asimov's Masters of Science Fiction

Dial/November/\$8.95

Isaac Asimov's Science Fiction

Anthology: Volume I

Davis/October/\$1.95

(1979 edition)

Contents of both books are identical.

Asimov's Choices:

Extraterrestrials & Eclipses

Dial/November/\$1.75

SIDLEY, Elyse [editor]

Gateway to Science Fiction Stories

Target Press (Oak Tree Publications)/September/

Illustrated. \$4.95

120 GALILEO

(J)

SILVERBERG, Robert [editor]

Lost Worlds, Unknown Horizons

Thomas Nelson/December/\$6.95

TORGESON, Roy [editor]

Chrysalis Volume 3

Zebra/December/\$1.95

WEINBERG, Robert [editor]

Lost Fantasies #8

Robert Weinberg/\$2.00

ALEPH SUPPLEMENT

1978 Additions

BLACK, Campbell

Asterisk Destiny

Marion/December/\$9.95

McCAMP, E. Sprague

The Great Fetch

Doubleday/December/\$7.95

Portions entitled "Heretic in a Balloon" and

"The Witches of Manhattan" previously published

in *John Asimov's Science Fiction Magazine*

FAYSTON, Edward

The Pirate of Hitchfield

Manor Time-Past Editions, \$2.25

FOSTER, Tony

Zig-Zag to Armageddon

Fantasy Publishers, Inc./October/\$10.95

10733 Hollywood Blvd., Suite 312-Hollywood, CA

90028

FOLGER, Peter

The Dooming Eye

The Smithsonian, by Horizons/December/\$4.00

MILLER, James B.

Mars Wun

Archelon Press/\$2.95

MOORE, Donald L.

Mirrors of the Apocalypse

Charles House (dist. Two Continents)/October/

\$4.95

OSBORN, E. M.

Short Visit to Ergon

Marion House Ltd., Publishers, \$4.95

(Box F-26) The Christian Science Monitor/One

Norwin Street, Boston MA 02111

RIMMER, Robert

Love Me Tomorrow

NAL Signet/December/\$1.95

SKOLSKY, Syd

The Affectionism Society

Illustrations by Kathleen M. Smith

Parth Publishing Enterprises, Inc./\$3.95

(P.O. Box 430373, South Miami FL 33143)

VERSFAU, Germanique

Yolanda: Slaves of Space

Translated from the French by Sam Flores

Grove Press/\$1.95

First publication in France

WILLIAMSON, Jack

Golden Blood

Illustrations by Steve Fabian & J. Allen St. John

Tamelfane Press (dist. by Tom Underwood-July

\$15.00

JANUARY AND FEBRUARY ISSUES

ANTHONY, Peter

The Source of Magic

(Fantasy) \$2.10

Holtzner-deRey/February/\$1.95

In *A Spell for Christmas* (voted Best Novel of 1977 by the British Fantasy Society) the seemingly useless Bink learned that his gift (everyone has one in Xanth) was not to be subject to the magic of others. This made him the logical candidate to undertake a hazardous quest (to discover the wellspring of Xanth's uniqueness). What no one reckoned was the Bink's success (despite the opposition of a powerful unseen enemy) would plunge that fantasy kingdom into deadly peril. The third book in the series, *Castle Ruogue*, will be published in July. Some readers will find all this charming, others merely cute (Anthony is a humanist).

ANTHOFF, Isaac

(J)

The Collected Fiction of Isaac Asimov:

VOL. 1: THE FARENOES OF TIME AND EARTH

VOL. 2: PRISONER OF THE STARS

Doubleday, January, \$12.95 each

(Vol. 1 is a selection of the SF Book Club in March at \$4.50.)

Vol. 2 contains: *Probleme au Skel*, *Earth is Room*

Enough, *The End of Eternity*, Vol. II contains: *The*

Mars, *Star Dust*, *The Currents of Space*, *The*

Messiah War

BABY, Gerald Earl

(F)

Sword of the Nurlingas

(The Saga of Thorgrim Vol. II)

Wolke, January \$1.75

Herein laments by a new author. [Thorgrim, a young outlaw adventurer from the North, goes in quest of the sword and helm that are his heritage, and the Priestess who is his destiny.]

BINSCHOFF, David

Nightworld

Holtzner-deRey/January \$1.75

A decreed cyberg which thinks it is the Devil makes life hell for the citizens of the planet Styx (run by a computer imprinted with the personality of Queen Victoria). Only a 600-year-old android known as H.G. Wells and the young son of a local scientist can save the planet from "Satana's" mechanical werewolves, vampires and dragons. (There's a clear separation between science fiction and fantasy, right?)

BISHOP, Michael

(C+)

Catacomb Years

Birkley/Putnam/January \$10.95

Bishop has come to be regarded as one of the most important non-SF writers of the '70s. These stories, which have appeared in diverse markets over several years, together with the novel *A Little Knowledge* (and some as yet unpublished material) comprise a curious Future History of the period from 1946 to 2075 when the central U.S. government collapsed in part due to the rise of strong regional autonomies as symbolized by the Cuban Missile bubble cities sufficient unto themselves. "Snuffing infernos" where you could go crazy without ever realizing the depths of your own madness. The residents of Atlanta, Bishop's representative Ome, encased beneath their transparent shell, encountered such cultural and social phenomena as "organoplasia, septigenalazans and Glosadrians, not to mention the arrival of aliens from Cygnus and religious hysteria. May be excluded compared with Ouch's *IFF* and Weinberg's *The World Inside*, novels whose influence this author acknowledges.

HOOCH, Robert (CHR)

Such Stuff As Screams Are Made Of

Introduction by Graham Wilson
Ballantine del Rey / February / \$1.95

BRADLEY, Marion Zimmer
and ZIMMER, Paul Edwin

The Survivors

[Sequel to *Hunters of the Red Moon*]
DAW / January / \$1.95

BRIENOR, Reginald (C+)

The Schimmelhorn File:

Memoirs of A Dirty Old Genius
Ace / February / \$1.95

CALDECOTT, Mosca (F)

Shadow on the Stones

[The Sacred Stones Trilogy, Vol. III]
Hill/Wang / February / \$8.95
First published in UK (1978) by Rex Collings, Ltd.

CARD, Orson Scott (C+)

Capitol

[The Writing Chronicle: Vol. I]
Analog Books / Oct. / Jan. / \$1.95
The book-length debut of the surprise winner of last year's John W. Campbell Award for most promising new author, Capitol is a series of connected stories that trace the consequences to sooner when "people use the drug that makes space travel possible to try to live forever." Against the backdrop of the rise and fall of a galactic empire, we observe the (mostly tragic) destinies of a few individual men and women whose all too human yearnings for immortality produce an inhuman environment. A companion volume, the novel *But Sleep*, will follow in April. Several of the episodes have been previously published in *Analog*, *Dune*, and *Omni*.

CHALKER, Jack L.

A War of Shadows

Analog Books / February / \$1.95
An illumed political sensibility detectable in Jack Chalker's *Well World* extravaganza and others, especially *Dancers in the Afterglow* here comes to the fore in his first novel not to be published by del Rey. Set in the near future, this is a suspense thriller, compared by the publishers to *The Androids' Story*, which depicts the havoc wrought when terrorists employ germ warfare against American civilians. What is the Wilderness? Greatness and who is responsible? And why?

CHANDLER, A. Benjam

The Far Traveler

[Romance series]
DAW / February / \$1.50
First publication in UK (1978) by Robert Hale.

CHURCH, Ralph (adapter)

Mork and Mindy (A Novel)

Pocket Books / February / \$1.95

CLARKE, Arthur C.

The Fountains of Paradise

Harcourt, Brace Jovanovich / January / \$10.00
SF Book Club / May / \$3.50+

[Excerpt in *Phobos*]
Long in gestation, *Fountains* is the culmination of its author's dream plan and represents to him his final commitment to the reader. Clarke delivered the novel on the day of his sixtieth birthday. He hopes to be free at last to enjoy the interesting life he has built for himself on the far-off island now known as Sri Lanka, where the events of this book

take place. Two unfathomably conceived construction projects are contemplated: one, the Pleasure Gardens of King Kaldava, a second-century dictator of "Tatpazanc" who sought thereby to reach Heaven; the other, two thousand years later, an engineer's dream of a new era in space travel to be brought about by a 22,000-mile-long "space elevator" as an overhead satellite. Advance reviews indicate that what is likely to be Clarke's final novel is not the masterpiece for which we all might have hoped. Nonetheless, despite some disappointment in its prolixity, *Imperial Earth*, this is likely to be regarded by many as the SF publishing event of the season.

COFFYR, Basil (CHF)

Here Be Daemons:

Tales of Horror and the Uneasy
St. Martin's Press / February / \$8.95

First published in UK
A few of these more-or-less conventional nightmares (mostly Lovecraftian or supernatural) bolder on SF.

DALEY, Brian (F)

The Starfollowers of Coramonde

[Second in a series]
Ballantine del Rey / February / \$1.95
Gil MacDonald, the former American tank commander who found himself unaccountably transported to a storybook magical kingdom and the noble prince whom he helped to restore to the throne, return in this sequel to *The Dreamers of Coramonde*. Back again also is the villainous Yashil Bey, the master wizard who plots to destroy all this is good in Gil's elected homeland.

DANIELS, Max

Offworld

Pocket Books / February / \$1.75
Profile genius, novelist Roberts Gelfin demonstrated her proficiency in the SF genre (and first used her pseudonym) with the amazing romp, *The Speed Guardian*. Banned from Earth as [a social rebel and outcast], hero Max becomes involved with the Enshok [nomadic mercenaries at war with the evil Stribak]. His attempt to rescue the [sic] goddess of the tribe brings about intergalactic combat.

DAVIDSON, Avram (C)

The Best of Avram Davidson

Edited by Michael Kurland
Preface by Peter Beagle
Doubleday / January / \$7.95

deCAMP, L. Sprague (F)

Conan the Liberator

[Barataria Conan series, #2]
Barataria / February / \$1.95

deHAVEN, Tom

Freaks 'Amour

Motown/Morris Quill / February / \$9.95, \$3.95 (pb)
Set in a grotesque and decadent future world, the result of a nuclear explosion, a hideous race of mutants has been created. Two of them are a couple who perform sexual acts for the delectation of "Normals" in order to earn money for a cosmetic operation. This first novel is at the same time sordid and morbidly powerful, with descriptive passages of undeniable (if possibly overdone) influence. Kinky.

DEMARINIS, Rick (C)

Jack and Jill:

Two Novellas and a Story
Torrey (A Hein Robbins Book) / January / \$9.95

DISCH, Thomas M.

On Wings of Song

The Magazine of Fantasy and Science Fiction
February / March / April
St. Martin's Press / August / \$30.00 (tentative)

DIANE, Diane (F)

The Door Into Fire

[First of a series]
"Doriente" by David Gerrold
Dell / February / \$1.95

FAWRECE, Don etc. (GN)

The Trigan Empire

(US) Book Sales, Inc. / February / \$6.98

FISCHER, Alan Dean

Mission to Moulokin

SF Book Club / February / \$2.98+

Ballantine del Rey / April / \$1.95

GARRITT, Randall (C+)

Murder and Magic

[Lord Darcy series]
Ace / January / \$1.95

Set in a parallel world where (Richard the Lionheart did not die in the year 1199, but went on to found the mightiest and most stable empire in history, where the laws of extrasensory perception have been codified but those of physics remain unaltered, where Magic is a science and science is an art) these stories in a popular series feature a master detective, rather resembling the author, who solves occult (but not unnatural) crimes with mouse logic and analysis. Although not prodigiously talented per se, Lord Darcy has, in Garrett's words, "his ability to leap from an unwarranted assumption to a foregone conclusion without overlooking the difference in between." A "Magic and Mystery Club" has recently been formed which members of the series and its creator will want to contact at P.O. Box 2957 / Hayward CA 94540. Marion Zimmer Bradley puts it well: "Garrett has combined the best of the fantasy and detective genres and made them work as science fiction."

GASKELL, Jane (F)

Some Summer Lands

[Vilon Saga: Book V]
St. Martin's Press / February / \$8.95
First publication in UK (1978)

GOLDIN, Stephen

Trek to Madworld

[A Star Trek Novel]
Barataria / January / \$1.95

GOUTART, Ron

Cowboy Heaven

Doubleday / February / \$7.95
Formerly titled "Back in the Saddle Again," Robots (mis)functioning, of course—Hollywood the Wild West, agents pokies Texas nostalgia, pop culture, etc. It is to laugh.

HALDEMAN, Joe

World Without End

[A Star Trek Novel]
Barataria / February / \$1.95
Kirk, Spock, etc. are trapped on [Chantala], a futuristic, artificial world, inhabited by furry winged creatures with awesome powers. The second new adventure of the *Enterprise* by Halldeman (Joe), Oh, yes, I forgot—Klingons!

JONES, D. F.

Earth Has Been Found

Dell / February / \$2.25

Drew Whyte

GALILEO 121

This novel of alien menace by the author of the *Colossus* trilogy is not a title in Dell's regular SF line edited by Jim Frenkel. Perhaps a superficial similarity to *Invitation of a Body Snatcher*, which Dell also publishes, suggested the possibility of mass market appeal. Mysterious plane crashes herald the arrival of deadly parasitic creatures with a three-hour blood.

KAYE Marvin

The Incredible Umbrella

Doubleday/January/\$7.95
Postponed from December

KILLGOURG Lee

A Voice Out of Ramah

Ballantine-Dellrey/January/\$1.75

Five hundred years the isolated colony world of Ramah has been dominated by a theocracy run by a male minority, supposedly spared by Divine Will from the deadly virus that ravages young men. The status quo is upset by the advent of an intergalactic saleswoman. When her guard is struck down by the disease, a member of the priesthood finds he can no longer keep the truth a secret. Among (Karek) Lee Killgourg's relatively few stories to date since her 1970 debut are "Stalking Game" (in *Galileo* #3) and "Tropic of Eden," selected by Terry Carr as one of the best stories of 1977. This is her first novel.

KNIGHT Wallace E.

Lightstruck

Little Brown/February/\$8.95

The inhabitants of a small Midwestern town intercept a mysterious sudden light that fills the nighttime sky, each in his different way. This study of the subjective nature of alien phenomena is variously described as "a clever parable" and "alien.com" with an unnecessarily artificial style.

LARSON, Glenn A.

adapted by Robert THURSTON

The Cylon Death Machine

[Hartman's *Galactica* series, #2]
Berkley/January/\$1.95

[Starbuck and Apollo fight to rescue a planet of love clones, mind-slaves of the Cylon Warrior Vulpa, who have been forced to develop the ultimate weapon—and run it at the embattled starfleet of humankind.]

LEE, Tansil

Death's Master

[Second in a series]
DAW/February/\$1.95

Many who have read *Night's Master*, which DAW published in November, have found it to be Lee's finest fantasy to date. Now Ashram, Prince of Demons, returns in a full-length novel of the days when the Earth was flat, here joined by Uthane, another lord of darkness to whom men and women are only playthings.

LEM Stanislaw

A Perfect Vacuum

Translated from the Polish by Michael Kandel
Harcourt Brace Jovanovich (A Helen and Kurt Wolff Book)/February/\$8.95

Perhaps the most unconventional sample of Lem's oeuvre yet to be published in English, this item is hard to pigeonhole. It consists of a collection of literary criticism—of books that have never been written! The range of subjects is great and provides the author with much opportunity for the exercise of his acerbic wit.

LOWENTHAL, Mark M.

Crispan Magicker

Acorn/February/\$1.95

Another epic fantasy by another new author. The uneasy balance of power between two rival kingdoms following the collapse of the Great Empire is disturbed when the Order of Magicians and Wizards expels one of their own for practicing the forbidden art of necromancy. Against the renegade and his army of the undead the Order dispatches his former pupil, Ichid prodigy, consummate conquer, Master of the Five Arts—who must now use his powers to kill.

LYNN Elisabeth A.

Watchtower

[The Chronicles of Terror I]
Berkley-Putnam/February/\$9.95

Heroic fantasy is being revitalized by new sensibilities. Familiar conventions (mostly macho clichés that did not seem offensive in the age of Robert F. Howard) are being re-examined by younger authors who love the genre but deplore its crudities. Lynn's devotion to her craft is winning her an increasingly large following (she was a recent nominee for the Campbell Award). Feminists, gays, and bisexuals will find sympathetic attitudes in her work but then do not generally suspect the progress of her storytelling or bight the insights and insight with which she depicts her characters. A sequel, *The Dancers of Arise*, will follow in June.

MAIKOWSKI Michael F.

and WOLF Chen L.

Fire in the Sky

Major/February/\$1.75

MARKS Alan

The Antenna Syndrome

Balmain Tower/February/\$1.75

MATTHEWS, Clyde

The Ides of March Conspiracy

The Year the L.R.S. Got What It Deserved
Arbor House/February/\$9.95

MILLHISTE, Marjory

The Mirror

Putnam/January/\$10.95

MONSABRAI, Nicholas

Running Proud

[Master/Master Book One]
Morrow/March/\$12.95

MODROCK, Michael

The Lives and Times of Jerry Cornelius

Dale/February/\$1.75
First publication in UK (1976) by Allison & Busby.

NICHOLSON, Sam

Captain Empirical

Analog Books/January/\$1.95

[Captain Schuster, hardbitten master mariner and ace trouble-shooter for Space Mining Incorporated] is the creation of a new and frequent contributor to *Analog*, a character in a time-honored tradition, the hard-boiled "guy" yarn. Is it a secret to find it of interest that the author behind that tough-sounding moniker is a woman?

NORTON, Andre

Galactic Derelict

The Defiant Agents

The Time Traders

Key Out of Time

[The Time Traders series]
Georg Press/January/\$8.95 each, \$35 the set.

PUHL, Fredrik

Jem

Galaxy, December, 1976/June, 1979
St. Martin's Press/April/\$10.00

ROBENS, Howard

and WASSERMANN, Jack

Hambro's Lieh

Doubleday/January/\$8.95

ROBISON, Kenneth

Tunnel Terror

[Daw-Savage series #93]
Bantam/February/\$1.50
First publication in *Daw Savage Magazine* (1940)
written by William G. Biggart and Lester Dent

ROBINETT, Stephen

Projections

Analog Books/January/\$1.95
Ballantine/April/\$5.95

SABFRHAGEN, Fred

Love Conquers All

Av. January/\$1.95

The Mask of the Sun

Av. February/\$1.95

SARGENT, Pamela

The Sudden Star

Fantecit Gold Medal/February/\$1.95

SCHEFFER, Harvey L.

The Eagle and the Sword

Popular Library/January/\$1.75

SEITZER, David

Prophecy

Ballantine/February/\$2.25

SHAPIRO, Neil

Mindcall

Major/February/\$1.75
Postponed from 1978.

SHAW, Bob

Medusa's Children

Doubleday/February/\$7.95
AF Book Club/May/\$2.99+
First publication in UK (1977) by Gollancz.

Vertigo

Av. February/\$1.95
First publication in UK (1978) by Gollancz.
[A version of a short story published in U.S. as "A Little Night Flying" (*Galaxy* 17, August, 1974) and in UK as "Dark Iconus" (*ISF Monthly* No. 4).

SHREFF, John

Transmaniac

Zebra/January/\$1.95
Postponed from November, 1977.

SIMON, Leonard

Reborn

Arbor House/March/\$9.95

SILVERFORD, Brian M.

Balance of Power

[Barolus series, #5]
DAW/January/\$1.75

SHUFFLE Address E. (adaptor)

That Man On Beta

(Black Rogers series, #2)

D. H. Runners \$1.95

Based on a screenplay by Bob Sharone

MULLIVAN, Mike

Station Zero Zero

Major February \$1.75

VADIPS, John

Titan

Today January April

1600s-Present March \$1.95

WALKER, Hugh

Army of Darkness

(Mafia series, III)

Translated from the German by Christine Priest

D&W January \$1.50

WILLIAMSON, Jack

Brother to Demons, Brother to Gods

Bobbs Merrill February \$10.00

NE Book Club June \$2.49+

WILSON, Robert

Tentacles of Dawn

Major February \$1.75

ZITAGNY, Roger

(O)

The Chronicles of Amber

SE Book Club January \$5.98+

Vol. I contains: *Nine Princes in Amber*, *The Gate of Azoth*, Vol. II contains: *Sign of the Unicorn*, *The Hand of Oberon*, *The Courts of Chaos*

ANTHOLOGIES

BALEN, James (editor)

Destinies: (Volume One, Number Two)

Nov. January \$1.95

Discontinued from December

FRANKEL, James (editor)

Binary Star #2

Dell February \$1.75

"The Twilight River" (Gordon EKLUND)

and "The Ties" (F. Paul WILSON)

GILPIN, James (editor)

The Road to Science Fiction #2

FROM WELLS TO HEINLEIN

N&N Memoir February \$2.25

MARTIN, George R.R. (editor)

New Voices II: The Campbell Award Nominees

Nov. February \$1.75

HURLFISON, Rex (editor)

Chrysalis 4

Zebra February \$1.95

—G—

Games

[continued from page 131]

memory with every game played. The rules are simple, but play is sophisticated; as a result, it holds appeal for all contestants, young or mature.

On a 25-square grid, two players (or Drew Whyte/Games

a team) attempt to be the first to line up four tokens of their own color, which may be red or white. The tokens are transparent. At the outset, six circular tokens contain white discs within; a like number of squarish tokens hold red discs. But the white discs are red on the opposite side, while the red ones are white on their reverse. As tokens are brought onto the board, the player runs the risk of positioning them on grid spaces beneath which rest strong magnets that may flip the discs to the opponent's color. Not all magnets under the grid activate the discs...thus, intelligent play consists of the usual tactical offense/defense combination, plus memorization of the magnet pattern revealed during progress of the match. (The magnets are repositioned after each game. There are 245,760 possible combinations.)

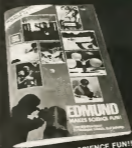
Touche employs modern technology in the most unusual, addictive strategy game I've played in years. A must for your next shuttle hop to Moonbase (but mind the magnets during freefall).

A Second Opinion: Prior to the start of this column, and Eon Products game, *Cosmic Encounter*, was reviewed in these pages. It was faulted for having a complicated set of rules, which is

correct. However, it should be noted that compared to most other games of adult battle tactics on the market, *Cosmic Encounter* is not unusually difficult to learn; it is, in fact, a deal less complex than such a mind-boggler as, say, *1914*, or even *Gettysburg*, which is usually regarded by war game buffs as an easy, or beginner's entry into the field.

Cosmic Encounter is worth investing time in learning because it possesses a unique plot factor that turns every match into a new play experience. Essentially a battle of "alien races" for planetary colonization, it pits such races as telepaths, immortals, etc., against one another. Each "race" (read: player) possesses a special "power" which permits bypassing of certain game rules. New alien identities are chosen at random at the start of each match; thus a new set of variables is operant and play experiences vary tremendously, depending on which aliens are "in the game" each time.

This is a concept I have not encountered in any other game. In my opinion, it distinguishes *Cosmic Encounter* as an unusually imaginative product, one which appeals to mature players, as well as children. —G—



FREE!
EDMUND
SCIENTIFIC
CATALOG

EXPLORE WITH US!
Over 4,000 exciting products in our FREE 160 page color catalog... Astronomy • Biofeedback • Binoculars • Computers • Diffraction Gratings • Fiber Optics • Health • Lab Equipment • Lasers • Lenses • Magnets • Microscopes • Motors • Treasure Hunting • Unique Lighting • Weather... and much more... to the EDMUND WORLD OF SCIENCE!

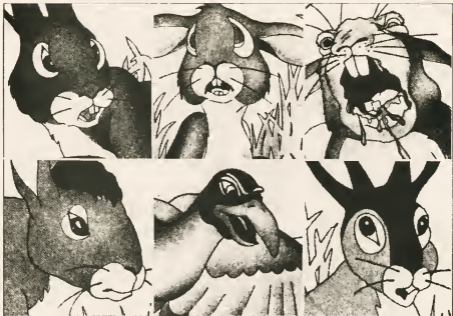
EDMUND has a proud 36 year record of service to the hobbyist, serious amateur and professional!

RUSH ME YOUR FREE CATALOG!

Name _____
Address _____
City _____
State _____ Zip _____

Clip and Mail Coupon Today to:
Edmund Scientific Co., #F02
Edmond, Oklahoma 73441, or P.O. Box 6007
Edmond, Oklahoma 73441

© Edmund Scientific Co. 1979



AVCO EMBASSY PICTURES CORP.

Entertainment

David Gerrold

WHEN *WATERSHIP DOWN* was first published, it was immediately dubbed "the bunny book" by doubters. It was hard to believe that a book about rabbits could be so...compelling, but compelling it was—as well as thoughtful, warm, compassionate, credible, and surprising. That it has become a respected landmark among novels, a genre one book thick, only serves to prove that even Murphy's Law doesn't work all the time.

Now *Watership Down* is a motion picture, a Nipenthe Production for Avco

Embassy Pictures; written, produced and directed by Martin Rosen. And bless them all, it is *faithful* to the book!—not only in the telling of the incidents and the evocation of the mood, but much more importantly in recreating an act of love from a storyteller to an audience.

Richard Adams's story concerned the migration of a group of rabbits escaping from their old warren—which is about to be destroyed by the construction of a suburb—to a safer world, and the problems they must overcome in order to establish a new and healthier rabbit

enclave. The appeal of the novel is in its portrayal of a believable rabbit society, including a heritage as rich as that of any human culture extant in the world today, and as imaginative as any created by any science fiction writer for a far-away world. These rabbits have a religion, a mythology, and a tradition of fables that are nothing short of stunning, not just as works of art, but as philosophical underpinnings that provide a backbone for the structure of the entire novel.

The movie does not capture all of the novel's epic magnificence. It would be asking too much to expect it to—there is just *too* much in the book for it all to be handled in 90 minutes of running time. But this is a forgivable fault. Few motion pictures have ever surpassed the novels they were adapted from—except perhaps *Jaws*, but never mind that now; that one was a special case.

What is important here is that the motion picture version of *Watership Down* works. It tells the story with just the right amount of schmalz (which is to say, as little as possible) and a great deal of gritty realism. You're not going to see any of Uncle Walt's cute little bunnies come *thumping* through the

David Gerrold



forest, hopping gleefully over fallen logs and hobnobbing with fluttery singing bluebirds and funny stuffy owls and ecnsy teensy butterflies. No way. This is serious stuff here. Painful, brutal, and harsh. The imagery is often stark and blunt.

These filmmakers have passed up the easy—and obvious—solution of turning the story into a “cute” movie, but the novel was a more mature and textured kind of tale and this team has obviously worked hard to capture that quality—perhaps a little too hard. The picture is flawed—not seriously so—but it *is* flawed. Its pictures are too often *uninspired*; they just don’t reach the quality of the novel. The style is simple, but not pristine; there is not the sense of *rightness* about the characters or the backgrounds; there is moodiness, but no mood. Something seems to be *missing* here. The vividness of the novel hasn’t quite survived the transition to the screen, where vividness is often the easiest of goals to achieve. I cannot help but feel that in their efforts to avoid being “Disney-cute” the filmmakers have gone too far in the opposite direction and unintentionally hurt their best efforts. The terrors are here—the

fox, the dog, the cat, the owl—but they aren’t terrifying, and they *should* be because we’re seeing them through the eyes of the rabbits. Because the terrors can’t provide the thrills, there is no contrast for the joys, no motivation for the laughter of release. The highs of *Watership Down* lack that extra little sparkle.

And some of the pieces don’t quite fit. There’s a song by Art Garfunkel—it’s sweet, but not inspired—but what is it doing *here*? There are pieces missing or glossed over too quickly: Fiver’s death, Hazel’s encounter with the cat, to mention two. I found myself wishing for a more *dramatic* style of art, something like the European or Japanese animation studios are capable of at their very best. The animation here is competent, but never *more* than that. Too often it’s difficult to tell one rabbit from another. It’s in the animation where the lack of brilliance is most keenly felt. The picture also needs a bit of what the Disney studios do so well: a dollop of old-fashioned American *kitsch*: something on which to hang an emotional hook—I wanted the filmmakers to tell me a little more about how I was *supposed* to feel about the

characters and situations I was seeing. I found myself wishing for a more deliberate score, perhaps a bit of John Williams; but *most* of all I wished the direction of the film had been more exuberant, more lively—it occurs too much in monotone, which is unfortunate because the film still manages to come so close to being something extraordinary. A very strange dichotomy.

There are two excellent and noteworthy performances here: John Hurt—who played Caligula in *I, Claudius*, and Quentin Crisp in *The Naked Civil Servant*—does his usual magnificent job as the dusk-and-velvet voice of Hazel, the head rabbit of the troop; and the late (and very sorely missed) Zero Mostel provides the voice of Kehaar, the rabbits’ seagull ally. Mostel’s is the liveliest performance in the film and, as is to be expected, he manages to steal every scene Kehaar is in—which is all the more difficult in an animated cartoon because he has to do it by sheer dint of voice alone. It is unfortunate that the animation of Kehaar does not match the vitality of his voice.

Watership Down is a film of grace and delicacy, it is a film of freedom and beauty, and you should not pass up a

chance to see it. The distributors are planning only a limited run at this time, so you may have to go some distance out of your way to catch the picture, but it is well worth the effort.

One cautionary note—if you have not read the novel, read it *before* you see the movie. The picture often uses words and phrases of the rabbit language without bothering to translate or explain them, and this could possibly be confusing to someone unfamiliar with the story. After reading the book, however, seeing the film is not a retelling so much as it is a reliving. The film manages to twang most of the right heartstrings at the right times, and ultimately that's what counts in filmmaking.

On a scale of ten (*Star Wars* being a 9.9 and *Planet of the Dinosaurs* a .01), *WaterShip Down* is easily worth a 7. (oh hell, David, stop being such a curmudgeon—give it a 7.5!) Go see it.

RALPH BAKSHI is an orc. That is the only logical explanation for the peculiar view of Middle Earth contained in the Ralph Bakshi production of *Lord of the Rings*.

If you have experienced Middle Earth, then you cannot help but view this picture with a kind of double-vision: each of us knows in his or her own heart what *Lord of the Rings* should look like; but to watch this film is to see its images only as darkling representations of what we know the real Middle Earth to be.

First off, this is not the complete story. Abruptly, arbitrarily, at a point where Frodo and Sam link arms and head off into one more muddy background, the film stops and a voice tells us that this concludes part one of *Lord of the Rings*. Audiences are generally underwhelmed by this announcement. It is met with catcalls and boos.

A solution, perhaps, would have been to let us know in advance that this is not the whole story. The film should be advertised as *Lord of the Rings—Part One*. A better solution might have been to film Tolkien's trilogy as a trilogy—*The Fellowship of the Ring*, *The Two Towers*, and *The Return of the King*—because as it presently stands, this film is far too long. Its running time of more than two hours is dreary, but not painful until the last forty minutes which muddles down into a series of long, confused, and pointless battle sequences—the battle of Helm's Deep,

I think—which nobody seems to win. We are given shot after shot of gratuitous violence, orcs and men bashing and thrashing at one another, stabbing and slashing and bludgeoning with all the grace, skill and artistry of a pack of arthritic rummies fighting over a fifteen-cent bottle of wine.

Part of the problem is that Bakshi has abandoned the craft of animation—especially in those places where the story most demands it—in favor of simulation, a technique not without its strengths, but not suited for this picture. Almost all of the menaces—the orcs, the ring-wraiths, the Balrog—are portrayed by live-action figures, photographically treated to look like drawings—but the eye cannot be so easily fooled; these are extras in raggedy costumes and Halloween masks acting out the motions of the battle, despite the blurring and muddying of layer after layer of processing and solarization and dye-transfer and all the other trickery that Bakshi has used. Real animation always has feeling to it—a feeling that is representative of the emotional commitment of the filmmakers as well as their ability.

Compounding the problem is that the backgrounds are also unclear: they are of the muddled school of background painting—"if we make it busy enough, with lots of scrubbed brushstrokes and shadows, it'll look like detail and the audience will think we're artists." But it doesn't work. When you superimpose muddled live-action over muddled backgrounds, the effect is dreary. I kept wanting to take a hose and rinse off the screen so I could see what was going on.

If the orcs are less-than-animated, our heroes fare little better—if, indeed, hero is the appropriate word. Aragorn, for instance, looks like a thug. He has all the magnetism of a plate of cafeteria spaghetti. It isn't too long before one starts rooting for the orcs to wipe out this imposter and his feeble fellowship while we wait for the *real* Aragorn and the *real* fellowship to arrive. Unfortunately, they never do. This picture is filled with cardboard imposters pretending to be the characters in Tolkien's trilogy and failing miserably.

Again, the problem is Bakshi's failure to animate. While his technique does produce a verisimilitude one rarely sees in animation, as well as a greater degree of expressiveness in the character's faces, it is also ultimately a failure because it also keeps those same characters earthbound. They seem too

heavy where they should be light, they never bounce, never dance, never seem to come alive—they always come across as simulations—and finally one cannot help but wonder, why bother to animate this at all?

One of the most serious flaws is the film's failure to create a sense of Middle Earth as a *place*. The forests are just great clumps of trees, the mountains are just big piles of rocks; there is no sense of distinction, no awesomeness, nothing to make you gasp in surprise and delight as the many descriptions in the book could do. If you want to get a *real* sense of what Middle Earth could look like, go find one of the Tim Kirk calendars that Ballantine Books published a few years back—now *that's* as stunning a Middle Earth as anyone has ever portrayed!

But all of the above are only symptoms. At the core is this: Bakshi has failed to grasp the heart of Professor Tolkien's world and bring it to life; he has missed the wonder and the magic. The film is tone-deaf to the poetry of Professor Tolkien's language, and blind to the magic of Middle Earth. Professor Tolkien used his language to weave spells of enchantment around his readers, that is the majesty of his success. Bakshi doesn't see that poetry, thus he can only trivialize Tolkien's incidents because he cannot convey their power. And because of that, a world that should live merely exists; characters that should inspire merely divert; events that should terrify merely distract. Bakshi has failed to capture the soul, the heart, and the songs.

It is probably no accident that Tom Bombadil is missing altogether. Bakshi doesn't seem to know how to portray a character who is all joy and song. Bakshi's elves, for instance, are about as mysterious as a Big Mac and as magical as an Anacin commercial. And Treebeard, the Ent, is portrayed as nothing more than a big walking tree—and not even a very good one; he has been robbed of his majesty, stripped of his power to awe and thrill us, and given only a pointless walk-on which will leave anyone not familiar with the trilogy as written wondering who he was and what he was doing here.

Little flaws abound throughout. We are told that Bilbo's sword, Sting, carried by Frodo, glows when orcs are about. Yet we never see that happen. Indeed, all the swords carried by the various warriors here are nameless.

storyless, and ultimately valueless. Bakshi shows them as dead metal, not live steel. We are never introduced to Shadowfax, Gandalf's horse—but then, the horse that Gandalf rides here is obviously *not* Shadowfax; Gandalf rides him with saddle and bridle, and any real fan knows how Shadowfax felt about such things.

The lack of magic is most apparent in Gandalf, who comes across as a caricature of Father Time. Bakshi portrays the wizard as a characterless old grump—we never see any real evidence of his wizardry at all, not even an occasional bit of fireworks. And when he is finally raised again as Gandalf the White, instead of being radiant (for white is a blend of all colors), he is merely colorless. The Man From Glad in chiffon.

Frodo and Sam fare a little better, likewise Bilbo—there is some sense of character for the hobbits, almost enough to give one hope for the rest of the picture, but the promise is never paid off, and the hobbits alone are just not enough to carry the baggage of the rest of the picture. Oddly (or perhaps not so oddly after all), the most effective characterization of all is Gollum, a deliciously malicious little snipe. But whatever life Gollum brings to this sorry mess is still too little too late and not nearly enough to rekindle a flagging interest.

The blame is Ralph Bakshi's and nobody else's. This is his vision of Middle Earth and a sorry vision it is.

Ultimately, one is left wondering what kind of man sees the heroic and beautiful in Tolkien as a flat cartoon, but the grotesque and horrifying as realistic visions. But then, we should have known not to expect anything more from this man. In his previous outing, *Wizards*, his hero, a codger named Avatar, eventually betrayed his own magic by resorting to a weapon of his enemy to defeat him—a handgun. If Bakshi has so little regard for the traditions of fantasy, why should we expect him to treat *any* fantasy with reverence?

The final failure is this: Bakshi has not given us hope—every successful adventure has hope in it somehow, and *Lord of the Rings* is about nothing if it is not about hope in the face of impossible odds. Bakshi has denied us this and in doing so has denied the point of the whole story. He leaves us only an evil concoction to trouble us and leave us unsatisfied.

—G—

David Gerrold/Telescope



"The Apollo expeditions made an amazing discovery: over 90% of everything we'd need for space industries, power satellites, habitats, ships, asteroid mines, and all the other dreams of the science fiction writers is found in industrial quantities on the Moon."

J.E.Pournelle

"My own personal guess, perhaps more hopeful than can be justified by present developments, is that by the end of the next millennium, in the year 2979, the Moon landings may be the only event of the 20th century that will be accorded more than passing notice."

Clifford D. Simak

"We, as the wealthiest and most productive nation on Earth, have a

Telescope

Our future

Our two-part commemoration of the Apollo 11 mission will begin in the next issue with the statements of five major science fiction authors. The subsequent issue will showcase the opinions of five major scientists.

special obligation toward all mankind, and we can hardly discharge it more benignly, with fewer harmful side effects, than by helping to open up the cosmos."

Paul Anderson

"If you ask 'Should we be in space?' you ask a nonsense question. We are in space.

We will be in space.

Mankind will become a creature of space."

Frank Herbert

"But in the long run, knowledge is the only sure reason there is for hurling someone, or something off the surface of the Earth."

Frederik Pohl

A moving experience

I am changing my address. Please note the information below.

Name:

Old Address:

Street or P.O. Box

City

State

Zip

New Address:

Street or P.O. Box

City

State

Zip

Please include an old address label or the information on the top line of your old address label if available. Please notify us at least six weeks before moving or you might miss an issue. Send to: *Galileo*, 339 Newbury Street, Boston MA 02115

GALILEO 127



SUPERMAN, THE MOVIE

Directed by Richard Donner.
Screenplay by Mario Puzo, David and
Leslie Newman, and Robert Benton
Warner Brothers, Inc.

Reviewed by Carol Kalish

WELL, YOU *still* might not believe that a man can fly, but you'll be thoroughly entertained by this latest effort to breathe life into the story of the "Man of Steel." While the film is not without serious flaws, it does succeed in creating a believable fantasy world where even the laws of physics and space/time relativity cannot prevent Superman from fighting for Truth, Justice, the American Way, and Lois Lane. Although it teeters precariously between the twin evils of being a mere vehicle for the special effects and/or the victim of pretentious or 'campy' direction, the movie is still a lot of fun when it decides to rest on the *appeal* of its story line and the abilities of the actors to develop attractive personalities from the cardboard comic book characters which form the core of the Superman legend.

Most of the film's faults arise from a clash of interpretation between the various screenwriters and director, Richard Donner. Mario Puzo maintained that the scope of the Superman mythos demanded a deadly serious approach and his screenplay reflected his belief that Superman could best be treated as a hero out of a Greek play. Donner agreed that the movie would have to maintain the epic qualities of the original Superman story, but he also believed that the story should be told in a lighter, more entertaining style. David and Leslie Newman were asked to humanize and lighten Puzo's original script. The Newmans took the opposite approach and concentrated on the campy, comic book aspects of the story. Again Donner was dissatisfied with the screenplay, and Robert Benton was hired to patch the two earlier efforts together and to rewrite key scenes and characters when the former screenplays failed to mesh well. The problem with this patchwork screenplay is that the movie remains a conglomeration of separate scenes, each being wildly different in mood and pacing from the others. Some of these scenes work well and contain just the right mixture of

humor, serious adventure, and escapist fantasy; other scenes, however, are not so successful and interfere with both the flow of the movie and the viewer's overall enjoyment.

The film's main flaw is that the worst scenes occur at the beginning of the movie. The opening sequence retells the story of the destruction of Krypton and the last-minute escape of the infant, Kal-El, to Earth. Although this should have been one of the movie's tinniest moments—as Jor-El (Marlon Brando), Superman's father, battles against both time and the Kryptonian government in order to create the space ship that will carry his baby son to earth—the screenplay and Brando's performance conspire to produce a scene whose ominously slow pacing, heavy dialogue, and heavier delivery destroy the tension contained in the story line. The only saving grace of the first twenty minutes of the film is the special effects which include the spectacular destruction of Krypton as well as a terrifying vision of the phantom zone. Krypton's super-technological version of a maximum security prison. Despite the special effects, however, the poor pacing and heavy dialogue combine to get the

movie off to a slow start.

The movie improves as soon as we leave Krypton. In a change of mood, the film shifts from attempting to be a modern epic to being merely nostalgic. Baby Kal-El crash-lands on Earth and is adopted by John and Martha Kent (Glenn Ford and Phyllis Thaxter), residents of the Norman Rockwell town of Smallville, U.S.A. The Kents raise their adopted son as Clark Kent and convince the boy that his great super powers carry with them grave responsibilities. The mood is rampantly nostalgic as Clark lives in an America where Cheerios and cheerleaders are indispensable parts of growing up and the generation gap hasn't yet come in the way of warm father and son discussions. The pacing is still slow, but the deliberate mellow, reminiscent mood draws the audience more willingly into an acceptance of the fantasy world than the earlier, more pretentious Krypton scenes did. By the time the eighteen-year-old Clark is ready to set out to discover his heritage, the viewer has been lulled into a receptive mood for what is to come.

The movie's pacing begins to pick up when Clark hikes to the Arctic, driven

by some inexplicable urge. There in the icy wilderness he discovers the Fortress of Solitude which Jor-El packed on board the space capsule. After commingling with his father's hologram and discovering the extent of his super powers, Clark Kent/Superman (Christopher Reeve) stands ready to serve his adopted world. When Superman appears for the first time, dressed in his familiar blue suit, and swoops off towards Metropolis, the audience cheers and the movie takes off.

In rapid succession, the viewer meets Perry White (Jackie Cooper), Lois Lane (Margot Kidder), and the rest of the *Daily Planet* staffers. With comic sparks flying every time either Clark Kent or Lois Lane appears, the movie actually begins to have a sense of humor. The movie doesn't just go for laughs, though. It goes on to produce some very satisfyingly suspenseful moments as Superman rescues Lois from a crippled helicopter, save the President from a freak airplane accident, and captures a boatload of thieves. To top everything else off, it has some appealing romantic scenes between Superman and Lois.

But wait! There's more! Superman
(continued on page 143)

2020 ...
On Film

Games

Marvin Kaye

**THE BIONIC WOMAN;
THE SIX MILLION DOLLAR MAN**
Parker Brothers

CHESS II
The Ungame Company

SPACE LINES
Invicta

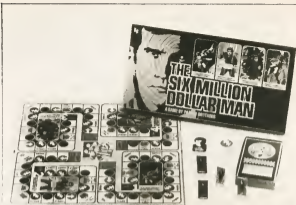
**SUPERMAN GAME;
Wonder Woman Game**
Hasbro Industries

TOUCHE
Gabriel Industries

WHAT PRECISELY is a science fiction game? Originally, I intended to limit this series of reviews to products reflecting a typical SF plot or theme, but this issue's submitted games require greater elasticity of definition.

Superheroes, for instance, strike me as fairy-tale figures far removed from the science-fantasy genre. Yet the popularity of bionic and comic-book hero TV shows further associates these critters in the public's mind with science fiction (for which, read: "the *Star Wars*"/Buck Rogers category").

A quartet of games from Parker Brothers and Hasbro reflect this growing interest in what is, at best, borderline SF. Though all four rely more on association with the superheroes than challenging play concepts, it must be remembered that these products are aimed at children, for whom fantasized identification with the hero is more important than the actual



play pattern.

Oddly, the two better games of the four are the distaff titles. *Wonder Woman Game*, though a spinner-dictated path contest, cleverly captures the race-against-time suspense of the TV series. The player's token must choose any of several paths to "break a secret code," that is, to arrive at a certain square before the opponent(s). Next, the *Mighty Amazon* must capture a spy by going to one of several "spy" cards turned face-down at remote board locations. If she chooses the wrong one, she must start again and keep looking. Once the spy card is found, the marker must be moved to the outside of the board to "catch" a "rocket" and escape. This satellite playing piece orbits the board continually and it is no easy matter to arrive at a space where it

will "land" by exact dice count. First player to so "escape" wins.

The Bionic Woman, like the other three games, may be played by two to four persons. The object is for Jaime Sommers (a token) to reach various board destinations and thus complete points-scoring missions. The player has considerable choice of mode of movement: by "helicopter" or "airplane" or "auto," depending on variables dictated by dice throwing and position of the token at start of the turn. Scoring is ingeniously aided by affixing plastic clips to completed mission cards, so even kids shaky in math can easily tally their totals.

These games are somewhat better than *Six Million Dollar Man* and the *Superman Game* because of greater opportunity for choice and a certain

Games



Photo: Photos

Photo: Photos

amount of skillful play. These latter products depend heavily on luck as dictated by the too-familiar spinner. Steve Austin follows four sequential paths, each representing an adventure. First to complete all four wins. Superman "flies" to one of many possible places to find, first, a villain and, second, a doomsday weapon. The villain is "flown" to jail and the weapon to a crime lab for dismantling. If these games sound similar to their respective distaff counterparts, it is because the game plots are indeed tediously similar. *Wonder Woman Game* and *The Bionic Woman*, better usages of these plots, are equally suitable for boys as well as girls.

Components in the four games chiefly consist of boards, spinners or dice, plastic tokens, and various cardboard

playing cards. Workmanship in the Parker Brothers items is superior, somewhat better than the Hasbro games. On the other hand, the Hasbro products employ better graphics, including clever game boards which show aerial superhero-eye-views of various terrains.

The three remaining products received this month are principally designed as two-person strategy matches. Each further tests the definition of what constitutes a science fiction game.

Chess II and *Space Lines*, for instance, are deliberately touted by their respective manufacturers, Un- game and Invicta, in SF terms, though actual play is fairly traditional. Invicta, maker of the superb, popular game of inductive logic, *Master Mind*, calls

Space Lines "the 3D game of the future." It is really a multi-level Tic Tac Toe, a product which has been available from other suppliers for years. *Space Lines* is an attractive plastic version consisting of four playing surfaces suspended one above another like levels of a municipal parking lot. Two, three, or a team of players take turns placing colored pegs on rows of nodes on any level. A win consists of a straight horizontal, vertical, or diagonal line of four pegs and may be contained on a single level or extended over all four levels. Good play requires a careful balance of offensive and defensive strategy. *Space Lines* is challenging and appealing in design.

Chess II, says its manufacturer, is "the first improvement in chess in 500 years," an adaptation of the old game onto a "Space Age battlefield." Both claims are rather exaggerated. The playing area is imaginative, but more reminiscent of *delirium tremens* than the future. And the claim to originality is far surpassed by Bob Abbott's remarkable chess variant, *Ultima*, first introduced in the December, 1962, issue of *Recreational Mathematics Magazine* and later included in the Funk & Wagnall's paperback book, *Abbott's New Card Games*.

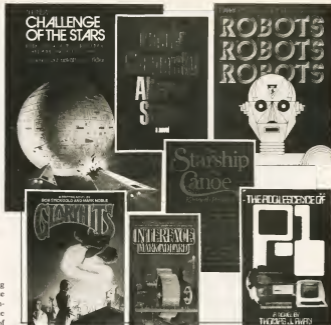
Nevertheless, *Chess II* is not without merit. It includes a serviceable set of plastic chessmen and a cardboard "regular" board on the opposite side of the touted playing surface, as well as a succinctly-stated summary of the basic rules of the game. As for the "advanced" playing surface, it is merely a normal chessboard twisted and distorted into odd proportions. The rules of *Chess II* are identical to chess, but the board disguises the layout of the pieces and disorients players—a chessboard out of a Gilbertian nightmare. On its own terms, *Chess II* is a real challenge, but I question its value to a confirmed chess buff. It seems a manufactured need.

Touche, the sole submitted product not described in SF terms, really best deserves the appellation. It is an excellent new twist on Tic Tac Toe that orbits the old paper-and-pencil pastime into the 21st Century. Handsomely designed, sturdily built, *Touche* might easily have been tied into *Star Wars*, since it employs a hidden force (magnetism) to create a subtle contest of strategy, minimal luck, daring offensive, and a new challenge to the

[continued on page 123]

Reviews

Floyd Kemske



THE STARSHIP AND THE CANOE
by Kenneth Brower
Holt, Rinehart and Winston, \$8.95

Reviewed by Jack Williamson

A UNIQUE and fascinating book. I've read nothing quite like it, and I found it completely absorbing. It offers the appeals of the best science fiction—of all good fiction—with the added fluff of being factual.

Freeman Dyson is best known to science fiction for his notion of the Dyson sphere—the exciting idea that the possessors of a really advanced technology would rebuild the mass of their planets into a shell completely surrounding their sun, to catch and use all its radiation.

A brilliant and distinguished astrophysicist at the Institute of Advanced Studies at Princeton, he is not content, as Einstein was, with abstract ideas alone. He longs to apply them. He took a leave of absence in 1958 to work on the then-secret Orion project—the spaceship to be driven by atomic bombs exploding behind a buffer plate and shock absorbers, which he hoped to ride at least to Mars.

A very different manner of man, his son George lives in a tree house nearly a hundred feet up a Douglas fir in British Columbia. Rejecting academe and most of organized society, he started smoking marijuana at age fourteen and left home at sixteen to follow a rootless, moneyless, generally aquatic way of life. His devotion to canoes and the sea makes a striking parallel to his father's obsession

with spacecraft and the stars.

The book cuts dramatically back and forth between father and son. There's Freeman's mind-opening suggestion that the comets, swarming in countless millions around our star and others and made of the same elemental stuff as we are, offer the most promising frontier for human expansion. There's George, ragged and barefoot, living like a primitive, exploring the Inside Passage north of Vancouver in kayaks of his own design, communing with killer whales.

The author, Kenneth Brower, gives George more space and perhaps a warmer understanding. He knows the Northwest coast and recreates it vividly. A seasoned outdoorsman himself, he has shared wilderness adventures with George. Yet he also knows the father well enough to offer revealing insights into his far-ranging speculations.

Personally, I found the book both profound and deeply moving. Having spent a summer on the Mississippi long ago with Edmond Hamilton and a few days more recently cruising up George's own Inside Passage, I can feel his fascination with waterways and natural life. Yet, having dreamed some of Freeman's dreams and fictionalized a

few of them, I tend to identify with him.

Though never didactic, the narrative raises questions that reach far beyond the obvious generation gap—questions of society and the self, of outer space and inner peace, of the rational and the intuitive, even of men and whales. Freeman is an outstanding mathematician; George seeks guidance from the *I Ching*.

Yet, with all their contradictions, the two men are strangely alike. Freeman has seen space flight as a possible escape from the pressures and hazards of too many people on Earth. George seeks space in a more personal way; people in groups make him uncomfortable. Though he has rejected most aspects of the technological culture his father dreams of taking into space, he uses high-technology aluminum tubing and fiberglass and epoxy to make his own refinements on the already-refined technology of the Aleut canoe.

Both men are worth knowing, and Brower presents them clearly. In style, in character revelation, in dramatic structure, *The Starship and the Canoe* can match fine novels. For me, it has a meaning and an impact that few novels can equal. George and his generation

may never even want to reach the stars, but the book leaves open the hope that perhaps their children will.

GLORYHITS

by Bob Stickgold and Mark Noble
delRey, \$8.95

Reviewed by Duane Edmunds

IF A DREAM of molecular biology is the synthesis of cheap insulin by modified bacteria, then *Gloryhits* is one of its nightmares.

What if the top Russian geneticists suddenly disappeared into a laboratory too secure for even our best operatives? What could happen if the CIA were involved in genetic engineering? What would happen if the Army were also recombining genes, but independently of the CIA?

Nothing good, you can bet, because we already know that some peculiarly gruesome weapons are lurking in the wings. What if the virus that carries the common cold also bore the genetic message for synthesis of a biological toxin, let's say the protein secreted by *clostridium botulinum*? The gene does not care what cell it lives in, which is to say that it only knows only one trick—to collect amino acids from the intracellular soup and string them into a protein. A myocardial cell, pulsing inside the chest, can in theory make botulinum toxin just as well as the original bacterium in its nest of improperly-canned vichyssoise. Quite plausibly, then, a mutated influenza virus could not only make your nose drip but could also turn each cell of your lung, liver, and kidney into a poison factory. The toxin kills by slowly paralyzing the conscious victim, and I leave you to imagine both the personal experience and the situation where twenty percent of the population is infected.

Gloryhits was written by two young geneticists and is about the development of such weapons. Perhaps because the authors, like many among the recent wave of molecular biologists, have turned their attention to the nervous system, they have also generated a subplot in which someone is testing a virus that might cause the birth of children with abnormally large brains—field testing it, in fact, by putting it in specific batches of exceptionally felicitous LSD and then monitoring records of "birth defects" in the towns where it was peddled. The pregnant wife of one

of the protagonists is thought to have partaken of the tainted goodie.

This mischief is uncovered by a group of lovable young geneticists, with help from a lovable young physician. Bob Stickgold and Mark Noble seem to have written about what they know, and the characterizations, if not deep, give an interesting view of the world as seen by a postdoctoral fellow. (Anyone who has spent time in the company of that tortured species will instantly recognize its vague paranoia and incessant concern for the academic job market.) Frankly, I liked the villains more than the heroes. The supposed protagonists are smug, with the arrogance of those who feel themselves to be leading the junior-level academic rat race. Major Pearson, the thoughtful army intelligence officer, and Johnson, the scientist flattered into working for him, may be misguided but at least are not unctuous.

The plot is based plausibly on public records of the CIA's testing of biological weapons, on available facts about gene recombination, and on a pretty good guess about how weapons research might be motivated and conducted. The science is accurate, with the forgivable exception that one cannot yet isolate, much less recombine, a gene for large-brainedness. (If Stickgold and Noble could do that, they would be writing Nobel acceptance speeches instead of novels.) The plot is ingenious and the action rapid.

I found the prose painful, but *Gloryhits* is a pretty good yarn, and after the first twenty pages the analgesic effects of a fast-moving tale prevailed. It's summertime at this writing. If the season demanded a realistic science thriller, then *Gloryhits* should fill the need.

THE ADOLESCENCE OF P-1

by Thomas J. Ryan
Collier, \$4.95

Reviewed by Charles Musselman

THIS IS a clever, if flawed, book. Who would have thought you could cast a computer program in the role of hero in a novel? The notion that machines can simulate living creatures might be familiar, but it is always interesting. Life evolves by the principles of variation and selection, swimming against the current of entropy. What if a machine were endowed with the capacities for variation and selection.

In *The Adolescence of P-1*, Thomas J. Ryan elaborates the consequences of such a machine. Initially, the machine is a program embodied in an academic computer, but the program is acquisitive and exploits the telecommunication links among North American computers to invade them. P-1, driven by greed and fear which are embodied in its original program, tries to aggrandize itself by infiltrating as much computer capacity as possible. And it tries to protect itself by avoiding detection. It goes about this by conducting its own goal-directed programming in the machines it acquires.

The original program was written by Gregory Burgess, a "professional non-student" and counter-culture hero in the mold of Richard Farina's Pappadopolis, who was intrigued by the challenge of subverting the all-powerful IBM control program. One of the book's strongest passages opens the story, when Gregory's creation, P-1 (First Partition), seeks him out in a backwater company, long after he has forgotten writing it. Joining forces with Gregory, his sexy wife, and a mad scientist, P-1 attempts to save itself by mounting an assault against Pi Delta, the secret government super-computer complex.

P-1's opponent, John Burke—a "cross between good Matt Helm and bad James Bond"—is easily the most interesting character in the novel. Gregory, for example, is a stereotype of the bright drifter. His sexy wife is another kind of stock character and the mad scientist seems a shallow, egotistical parody on Seymour Cray. But my major artistic criticism of Ryan's novel would be the clumsy way he patches these characters together. The sex scenes, in particular, seem to be gratuitous. They add nothing to the reader's appreciation of character or motive.

The use of rather flat human beings in a hook about a computer program is understandable. What I think deserves attention is the novel's lack of any sort of moral position. It may be clever (and technically feasible) to steal credit from Bank Americard, but is it right? Is it right for Military Intelligence to tap the phones of anybody they please? Are computer programs justified in crashing airplanes in which their opponents are traveling? Ryan doesn't know. Or—perhaps worse—if he knows, he's not dropping any hints. Life is, after all, more than a management problem.

P-1 does offer a pathetic defense of

"his" actions in the closing battle scenes. He doesn't want to die. Nobody wants to die, of course, but those of us who are prudent as well as sentient try to avoid deadly confrontation. P-1's "prime directives" of greed and fear actually do make him a plausible computer program, but not a sympathetic character. His lack of humanity is his flaw: he is lonely, doomed to struggle for survival in a world where he has no peer.

The author, of course, has no such excuse for his lack of a moral stance. Perhaps he feels he has made moral statement enough when P-1 comes to a bad end. If so, he is mistaken. The manner of P-1's demise can excite no sympathy and therefore no horror in the human reader. Perhaps my demand that the author make a moral statement is simply too great a demand, but aren't our favorite authors those who *feel* something about the situations they create? This vision of hedonistic professionalism is interesting, but it limits the scope of the literary experience. Great authors touch as well as amuse their readers.

THE NEW CHALLENGE OF THE STARS

by Patrick Moore and David Hardy
Rand McNally, \$9.95

Reviewed by Floyd Kemske

AS A CHILD, I was very pleased when I learned how to read in school, because it meant I could decipher the captions under the wonderful paintings in the "A" volume of our encyclopedia at home. The "A" volume contained a two or three page entry labeled "Astronomy." And the paintings would make my imagination soar: things such as "Saturn as seen from one of its satellites" and "Phobos in the sky over Mars." The only trouble with those paintings was that there were so few of them. As a child, I could never understand why the entire "A" volume was not given over to them.

All this is by way of background to explain my shameless admiration of a new book from Rand McNally for young adults. *The New Challenge of the Stars* is a picture book featuring thirty-four of those outlandish paintings. "Saturn as seen from one of its satellites" is here,

but there are other pictures which make that one seem downright pedestrian. How about "The spiral galaxy in the night sky of a planet located 200,000 light years from the main system" or "Colored shadows on a planet of the binary Zeta Aurigae"? The paintings are only part of this sixty-four page adventure. Photographs (Jupiter, Mars, and Venus), diagrams, sketches, graphs and text are sandwiched in among the spaceships.

The text—actually extended captions for the paintings—was written by Patrick Moore, whose efforts to bring astronomy within the ken of everyman are well known. It is easy reading, but geared to the intelligent mind. It comprises (intentionally or not) a concise explanation of current astronomical theory and knowledge, including: the history of discoveries in the solar system, interstellar radio communication, the formation of stars, the Hertzsprung-Russell diagram, and whatever else you might expect to find in an introductory text. There is not enough to keep a professional astronomer busy, but it is very stimulating reading for almost anyone else, regardless of background.

Conceptually, David Hardy's paintings are scientifically impeccable, from Jupiter's occlusion of most of the sky when seen from its satellite, Amalthea, through the hypothetical ice volcanoes (suggested by Carl Sagan) of Titan, to the exchange of stellar material between stars of the binary Beta Lyrae. Of course, Patrick Moore stands at the reader's elbow with useful interpretive commentary such as "the sun of this planet is out of the picture, to the right."

The publishers intend this book for ages twelve and up, and an interested twelve-year-old should be able to understand and be delighted by it. If you are too embarrassed to buy an oversized picture book for yourself, buy it for a young acquaintance and get it well before Christmas so you can read it before giving it to the kid. It is well worth your time.

The only problem with *The New Challenge of the Stars* is its brevity. With sixty-four pages, it is over much too soon. On the other hand, it is about thirty times the size of the "Astronomy" entry in my encyclopedia and the sense of wonder which informs every one of those sixty-four pages puts it about a parsec beyond any other gift book you'll see this season.

DREAMSNAKE

by Vonda N. McIntyre
Houghton-Mifflin, \$8.95

Reviewed by Geraldine Morse

DREAMSNAKE SNAPS you right up: healing with snakes is an intriguing idea. Having snapped you up, the action maintains a crushing hold on your attention as the heroine and her three snakes brave a hostile desert tribe to save a dying child. The end of the story is equally riveting, classic in its well-told and imaginative feat of endurance. It's between these two points, however, that *Dreamsnake* relaxes its constrictive grip, and a taut short story is stretched out into a somewhat limper full-length book.

The title refers to a scarce snake whose venom is used as an anesthetic by the primitive physicians of this novel's sparsely populated world. "Snake" is a healer who accidentally loses her dreamsnake—much of her value as a healer—and sets out across the planet to find another.

At this point author Vonda N. McIntyre had two options: she could focus on the quest and its fulfillment, or she could use it as a backdrop for the exploration of this alien world. Unfortunately, she has not really stuck to either. The impetus for the quest is dissipated while Snake gropes through a series of encounters with inhabitants who are too briefly met or ill-defined to be important in themselves, yet too contrived to aid the flow of her journey. Then lack of characterization does little to flesh out an otherwise unknown world.

In the desert Snake stays with a group of horsemen just long enough to suffer through seeing one die slowly and painfully because she is without her dreamsnake. The people are little characterized. From the time that Snake is first discovered in the desert until she meets and examines her patient, over 50 lines of text are used to describe her discoverer's horse, while not even a phrase is used to characterize the rider. In the 38 pages involving her stay with these desert horsemen less than one half of one page is devoted to their description.

With the mountainside people, wealthy and beautiful, Snake becomes more involved. Although she succors the two misfits of this flock, adopting one as her daughter, the mountainsiders are pretty stock characters, having about as much

The hard stuff is better.

HARDBACK BESTSELLERS

1. *The White Dragon*, McCaffrey hb, \$ 8.95
2. *Data Zero, Forever*, Liechtenberg, hb, \$ 7.95
3. *Strange Wine*, Ellison hb, \$ 9.95
4. *The Avatar*, Anderson hb, \$10.95
5. *Dreamscape*, McIntyre hb, \$ 8.95
6. *Whom Robes Mice*, Bradbury hb, \$ 6.95
7. *The Best Short Stories of J. G. Ballard* hb, \$10.95
8. *The Hour of the Dragon*, Howard hb, \$ 8.95
9. *Grey Mare of Morning*, Chast hb, \$12.50
10. *Red Shadows*, Howard (art: Jones) o.p. hb, \$27.50

GENERAL HARDBACK FICTION

11. *Arthur Rex*, Berger hb, \$10.95
12. *Arlas Struggled*, Rad hb, \$15.00
13. *The Plague Dogs*, Adams (art: Wainright) hb, \$10.95
14. *The Envers*, Mark hb, \$ 7.95
15. *All My Sins Remembered*, Haldeman hb, \$ 7.95
16. *Definitely Maybe*, Szegatsky hb, \$ 7.95
17. *World Soul*, Emvise/Parnov hb, \$ 7.95
18. *A World Out of Time*, Niven hb, \$ 4.95
19. *Alone*, Art, Dickson hb, \$ 4.95
20. *Iron Cage*, Norton hb, \$ 8.95
21. *New Conventions*, ed. Diach & Naylar hb, \$ 7.95
22. *Star Lord*, Lawrence hb, \$ 7.95
23. *Dragonquest*, McCaffrey hb, \$14.95
24. *Classic Science Fiction: The First Golden Age*, Cam, ed. hb, \$ 6.95
25. *The Hobbit*, Tolkien hb, \$ 6.95

GENERAL NON-FICTION

26. *Onions*, Leakey/Lewis (illust.) hb, \$17.95
27. *The Complete Fritz the Cat*, Crumb pb, \$ 6.90
28. *Artist and Computer*, Leavitt, ed. (illust.) pb, \$ 4.95
29. *Basic Computer Games*, Ahi, ed. (illust.) pb, \$ 7.50
30. *The Best of Creative Computing I*, Ahi, ed., (illust.) pb, \$ 8.95
31. *The Best of Creative Computing II*, Ahi, ed. (illust.) pb, \$ 8.95
32. *The Best of Byte I*, Ahi/Helmers, ed. (illust.) pb, \$11.95

SCIENCE FICTION NON-FICTION

33. *Mezozoos*, Harrison (illust.) pb, \$ 7.95
34. *A Field Guide to the Little People*, Arrowsmith/Moore (art: Edelmann) hb, \$10.90
35. *Alien Creatures*, Singer/Saaren (illust.) pb, \$ 4.95
36. *The Jewel-Minged Jaw*, Delany pb, \$ 4.95
37. *I Am Not Speech*, Murray (illust.) pb, \$ 4.95
38. *The Visual Encyclopedia of Science Fiction*, Ash, ed. (illust.) pb, \$ 7.95
39. *Star Fleet Medical Reference Manual*, Palestone (illust.) pb, \$ 6.95
40. *Petaropolis*, Sherkley (illust.) pb, \$ 7.95
41. *Great Bulls of Fire*, Harrison (illust.) hb, \$14.95

BOOKS OF NOTE

42. *Red Shadows*, Howard (art: Jones) o.p. hb, \$27.50
43. *POES*, Burgess hb, \$ 6.95
44. *The International Science Fiction Yearbook 1979*, Lester, ed. pb, \$ 7.95
45. *The Hills of Faraway*, Waggoner hb, \$16.95
46. *The Annotated From the Earth to the Moon*, Verne, (illust.) hb, \$16.95
47. *The Three Paladins*, Lamb (art: Hill) hb, \$12.00

PAPERBACK FICTION

48. *The Hobbit*, Tolkien (illust.) pb, \$ 8.95
49. *The Lord of the Rings*, Tolkien (boxed set) pb, \$13.95
50. *Home From the Shore*, Dickson (art: Odhart) pb, \$ 4.95
51. *The Foundation Trilogy*, Asimov pb, \$ 5.95
52. *Analog Yearbook*, Bova, ed. pb, \$ 5.95
53. *Dark Imaginings*, Boyer/Zahorski, ed. pb, \$ 4.95
54. *Ursula K. LeGuin's SF Writing Workshop: The Altered I*, Harding, ed. pb, \$ 3.95
55. *The Illustrated Dune*, Herbert (art: Schoenhart) pb, \$ 7.95
56. *The Best of Asimov*, Lewis, ed. pb, \$ 5.95
57. *Kingdoms of Elfin*, Warner pb, \$ 4.95
58. *Dark Vengeance's Vengeance*, Howard (art: Pithorpe) pb, \$ 7.95
59. *Cosmos and the Sorcerer*, Offart (art: Maroto) pb, \$ 5.95
60. *Masterspieces of Science Fiction*, Elton, ed. (illust.) pb, \$ 7.95
61. *Tower of the Elephant*, Howard (art: Robertson) pb, \$ 6.95

ART COLLECTIONS & ILLUSTRATED STORIES

62. *Yendie*, Smith (art: Matthews) hb, \$ 4.95
63. *Arach*, art: Moribus pb, \$ 6.95
64. *Neurochem*, Carben (illust.) pb, \$ 7.95
65. *The Illustrated Harlan Ellison* pb, \$ 4.95
66. *The Colossal Computer Cartoon Book*, Ahi, ed. (illust.) pb, \$ 4.95
67. *Masque Menon*, (art: Venetia) pb, \$ 4.95
68. *The Fantastic Art of Frank Frazetta*, art: Frazetta pb, \$ 7.95
69. *Frank Frazetta Book Two*, art: Frazetta pb, \$ 7.95
70. *Frank Frazetta Book Three*, art: Frazetta pb, \$ 7.95
71. *Idyll*, art: Jones pb, \$ 5.95
72. *Space Hawk*, art: Wolbertson pb, \$ 3.95
73. *Back for More*, art: Wolbertson pb, \$ 3.95
74. *Neurochem*, (art: Geiger) pb, \$14.95

MISCELLANEOUS

75. *Star Trek Blueprints*, Designs (illust.) pb, \$ 5.00
76. *Star Wars Blueprints* (illust.) pb, \$ 6.95
77. *Star Games*, Raza/Brightfield/Looney (illust.) pb, \$ 6.95
78. *Star Trek Intriguing Puzzles*, Raza (illust.) pb, \$ 3.95
79. *Blood, Ellison & Bloch* reced, \$12.95
80. *The First Kingdom*, art: Katz pb, \$ 5.95
81. *The Way The Future Was*, Pohl hb, \$ 8.95

Number	Title	Quantity	List Price
.....
.....
.....
.....
.....
.....
.....
.....

Total list price:.....

Less 10% discount on orders over \$10:.....

Postage costs—50 cents minimum/25 cents per book:.....

Total amount enclosed:.....

NAME:.....

STREET:.....

TOWN:.....

STATE:.....ZIP:.....

Order from: AVENUE VICTOR HUGO BOOKSHOP

339 Newbury Street, Boston MA 02115

(a post-paid GALILEO envelope is enclosed for convenience)

depth as the average American television family. They have no role to play in her quest.

Snake journeys to the city to seek the aid of technology; the inhabitants refuse to let her in. Not unnaturally, since they are never met, they never come alive.

These three encounters are the filler of the book, and they are annoyingly weak, given its evident potential. Ms. McIntyre is obviously happier with a much faster pace, with action rather than with motive. As Snake disengages herself from the sticky clutches of sociology and moves back into action, the reader is embraced by a most satisfying climax. The author has adapted the traditional trial-by-fire to her purposes in a delightful, unusual way. The discoveries and struggles of our healer are both intriguing and thrilling.

The novel's dustjacket makes reference to Snake as an example of a character written for the new Women's Market. Although traditionally female attributes are certainly reflected in Snake's actions, they are not particularly important to the success of the story. Snake's main characteristic is in fact without sex—she has absolutely no sense of humor, and is at all times most one-dimensionally serious, perhaps reflecting her medical heritage.

Dreamsnake is an elaboration of a Nebula award winning story, "Of Mist, and Grass, and Sand." Vonda McIntyre has fine, wonder-filled ideas. It must be hoped that here her reach has not really exceeded her grasp, but merely eluded it.

INTERFACE VOLTEFACE MULTIFACE

by Mark Adlard

Acc. \$1.50, \$1.50, \$1.75

Reviewed by Robert Lynn Asprin

AD LARD'S WORK encompasses three books, *Interface*, *Volteface*, and *Multiface*. The world described is a future Earth, altered by the discovery of a new multi-use miracle substance called Stahlex. Stahlex is used for everything from car bodies to ladies' stockings, from jewelry to wall panelling. The substance is converted to its varied useable forms in vast manufacturing complexes, fully automated and computer controlled. These concerns dominate the existing culture to the point where

nobody works except for a handful of "Executives." The Executives have been surgically altered to increase their brain capacity, and besides being the only people who work, they are the only people on the scene who involve themselves at all with the more refined side of life. Even this has its limitations, as in Adlard's future the creative process has ground to a halt. All music has been written, all paintings painted, and all philosophies explored and understood.

The story flows logically out of the setting. The masses revolt against the Executives. After putting down the revolt, the Executives decide they have to reinvent work to keep the masses happy, or at least preoccupied. When their master plan is put into effect, the results are not as they predicted.

Adlard makes several basic statements in his work. Automation causes unemployment. Unemployment breeds discontent. Work is good. These are time-honored concepts which must be accepted as irrefutable unless one is willing to enter into lengthy debates of sociology and economics. The vehicle he uses to make his point is the familiar device of extending today's trends into a distasteful tomorrow as a warning of what may happen if we don't change our ways. Unfortunately the world he has projected is exaggerated to a degree where it defies credibility.

Anyone who has worked with machines, particularly manufacturing devices or computers, quickly realizes that self-maintaining machines are a myth. The idea of decreasing a machine's down-time or malfunctions by making it more complex is more than slightly ludicrous. This concept, along with the "no work" world it spawns, is so difficult to believe, the reader tends to challenge even the basic statements the author makes. Adlard would have done well to have spent more time working on the logic of his world and less time inventing futuristic gadgets to clutter each paragraph.

Perhaps the most frustrating facet of Adlard's work is that one frequently feels so much more could have been done with the ideas and concepts—and done by the same author. At times Adlard shows a remarkable flair for satire, specifically when the Executives set out to design their new work force patterned after the old, inefficient, twentieth century business management concepts. One phase of this process is the deliberate seeding of

incompetent individuals throughout the various levels of management in the belief that one incompetent person in the right place can create twenty jobs for people who must circumvent or cover up his mistakes.

Another concept which would have been interesting if expanded upon is Adlard's assertion that when work stops, so does the creative process. Realizing the major contributions to the Arts, both historic and contemporary, by musicians and artists who devoted themselves exclusively to their creative endeavors, relying on a sponsor to provide food and shelter, there was much the author could have said to support or defend his theorem.

Mark Adlard is an author with things to say and the talent to say them. Unfortunately, the *Interface* trilogy is not the podium he should have chosen to say them from.

ROBOTS, ROBOTS, ROBOTS

edited by Harry M. Geduld and Ronald Gottesman

New York Graphic Society, \$14.95

Reviewed by R3D3 posing as James P. Hogan

WE ACCEPT as routine our ability to fly through the air at will and perform countless other feats which our ancestors only a few centuries ago predicted accurately in their dreams even though they had no concept of the technologies that would one day make those dreams come true. One dream which persists is that of an artificial creature that can emulate the actions, thoughts, and sometimes the form of man himself.

A collection of works by twenty-eight different authors, *Robots, Robots, Robots* traces the gradual evolution of this dream from its origins in ancient mythology (e.g., Pygmalion, whose statue of Galatea was brought to life and became his bride) through the ingenious mechanical toys and dolls of later Europe to today's Mars-landers, factory robots, and adaptively-programmed computers. Speculations as to where it could all lead cover a full spectrum of opinions ranging from the boundless hard-science optimism of Carl Sagan and Adrian Berry to a rambling philosophic discourse which, to me, boiled down to saying that what is and is not possible depends on nothing but semantics.

I found the book fascinating not so
Reviews

This is one voyage I don't want to miss. Sign me up for the special subscription rate I have checked below. My payment is enclosed.

- ☐ 6 issues at \$7.50 (special introductory offer.)
- ☐ 12 issues at \$12 (\$6 savings.)
- ☐ 12 issues for \$10 (special gift subscription.)

Name: _____

Street: _____ Town: _____

State: _____ Zip: _____

FOREIGN SUBSCRIBERS PLEASE ADD 50¢ PER COPY

FIRST CLASS

Permit No. 46476

BOSTON, MA

BUSINESS REPLY MAIL

NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

POSTAGE WILL BE PAID BY

GALILEO

339 Newbury St., Dept. G

Boston, MA 02115

much for its depth of treatment of any one facet of the subject (which is not what it sets out to accomplish), but for its breadth of scope. Using examples drawn from literature, drama, humor, and legend as well as from history and science, it presents the notion of artificial/synthetic man not as a product of Hollywood or of the SF writings of recent times but as something that has always existed at the roots of our culture. All stages of our emerging civilization reveal the same theme in differing guises, each an interpretation of the technology and beliefs of its own time. Thus we see mechanical bell-ringing human effigies in an era when mechanisms operating strictly according to Newton reigned supreme, a last word in transplants in the form of Baron Frankenstein's creation when medicine and electricity were coming to the fore, and visions of steam-driven colossi when a coal-fired Britannia ruled the waves. The age of the wireless and the telephone conceived conglomerations of coils and relays which by World War II had given way to vacuum-tube-based feedback systems. Today, of course, the ultimate model of mind has to be expressed in terms of better and smarter computers.

Forgetting the limitations of today's technology, what ultimately distinguishes man from machine? What would be the relationship between man and an artificially created species—servant and master (and which way round?), jealous rivals, symbiotic partners, or fellow adventurers? These questions and many more are examined from a variety of differing viewpoints selected from fact and fiction over the years to provide a refreshingly balanced picture. Doom-prophets and utopians both have their say, and the reader is left to form his own conclusions. What could be fairer than that?

By bringing together such diverse topics as Edgar Allan Poe's meticulous logical analysis of why the Maelzel chess-playing automaton had to be a fraud, a short but delightful speculation on robots as children's companions by Arthur C. Clarke, a satirical letter on mechanical evolution by a noted anti-Darwinist, and some science fiction by names like Lester del Rey, the book offers something for everybody. Also, as always happens with collections of this type, everybody will find something that doesn't seem to fit. For me, this something turned out to be a play from 1923 which was reproduced in its

entirety for reasons I found obscure, especially since it seemed to have more to do with women's lib than with robots. Maybe there was a message that I didn't get.

No work of this kind would be complete without some mention of robots in movies. In addition to having thirteen pages of the book's excellent illustrations devoted to everything from *The Golem* (1920) to *HAL* from 2001, the editors have compiled an exhaustive listing of cinema and TV productions featuring robots and related creatures from comedy (*The Bowery Boys Meet the Monsters*) to hard science (2001, *Forbidden Planet*). There is also a first-rate bibliography which is conveniently divided into two parts: "Robots in Fiction, Poetry, and Drama" and "Robots in Non-Fiction and Technical Studies." The theme of the whole book couldn't be summarized more succinctly than that.

ALTERED STATES

by Paddy Chayefsky
Harper & Row, \$8.95

Reviewed by Robert F. Stone



AS EVIDENCED by the films *Hospital* and *Network*, among others, Paddy Chayefsky has long established himself as a writer of immense talent. *Altered States* bears a certain resemblance to these two earlier works. For example, the main characters could almost be interchangeable: highly intelligent, recognition-seeking professionals whose lives are dominated by their work. And the charged, off-handedly intimate dialogue—always a Paddy Chayefsky trademark—is again prominent. But *Altered States* possesses an identity of its own. In *Hospital* and *Network*, Chayefsky deftly exposes the moral and structural infirmities of our economic institutions by extending the activities occurring therein to their insane conclusion. By comparison, the atmosphere in *Altered States* is primarily technological, not institutional in nature. This is a fundamental difference, for in order to illuminate certain questions of philosophy and science, Chayefsky was inescapably drawn to the science fiction genre.

The first part of *Altered States* introduces Edward Jessup, a psychophysicologist who devotes his existence to the study of whether, and by what

[continued on page 143]

Best Sellers

Compiled as of October 1st, 1978

HARDCOVER BESTSELLERS

1. **The White Dragon**
Anne McCaffrey: delRey
2. **Courts of Chaos**
Roger Zelazny: Doubleday
3. **Strange Wine**
Harlan Ellison: Harper & Row
4. **Big Planet**
Jack Vance: Underwood, Miller
5. **Heir of Sea and Fire**
Patricia McKillip: Atheneum
6. **Persistence of Vision**
John Varley: Dial

PAPERBACKS

1. **Dragonsinger**
Anne McCaffrey: Bantam
2. **Luelfer's Hammer**
Niven/Pournelle: Fawcett
3. **Battlestar Galactica**
Larson/Thurston: Berkley
4. **Lord Foul's Bane**
Stephen Donaldson: delRey
5. **Yurth Burden**
Andre Norton: DAW
6. **Dosadi Experiment**
Frank Herbert: Berkley
7. **Book of Merlyn**
T.H. White: Berkley
8. **Berserker**
Fred Saberhagen: Ace
9. **In the Ocean of the Night**
Gregory Benford: Dell
10. **Star King**
Jack Vance: DAW
11. **Kull**
Robert E. Howard: Bantam

Our thanks for their assistance goes to the following dealers: **Fat Cat Books**, Johnson City, NY; **Dark Carnival**, Berkeley, CA; **SF & Comic Book Shop**, Arlington, VA; **Dave Turner Books**, Bellevue, WA; **A Change of Hobbit**, Los Angeles, CA; **Complent Enchanter**, Minneapolis, MN; **Mile High Comics**, Boulder, CO; **Tobacco Corner Newsroom**, Memphis, TN; **Rock Bottom Used Book Shop**, Fayetteville, AR; **Book Den on Rice Blvd.**, Houston, TX; **Book Emporium**, Willimantic, CT.

Opinion

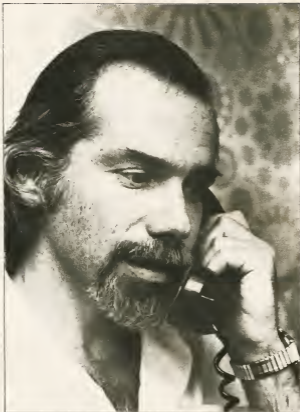
Robert Silverberg

A FEW months ago I found myself, very much to my surprise, emerging from a four-year retirement that was supposed to be permanent and signing a contract for the publication of a new novel. When the deal was struck, my editor—Buz Wyeth of Harper & Row—told me, “Of course we’re not going to market the book as science fiction. We’ll handle it as a straight mainstream novel.” Which leads me to the topic of today’s sermon: packaging and marketing.

Buz Wyeth is a shrewd man who has given frequent evidence that he knows what he’s doing. If he wants to publish *Lord Valentine’s Castle* as a mainstream novel, so be it. But it does take place on a planet umpteen light-years from here, fifteen or twenty thousand years from now, and to me that’s science fiction. Why call it something else when it’s published? Why, to sell more copies, of course.

Labeling a science fiction novel as science fiction provides a modest floor for sales; if it comes from a reasonably well-known publisher and a moderately well-known author, it will almost automatically sell a minimum of 3000 copies (if hardcover) or 35,000 (if paperback) because of the dependability of the audience, and of course it can sell more—up to ten times as much more—if the circumstances are particularly favorable. Whereas a mainstream novel left to find its way without a category label can conceivably sell 843 copies or less, and an embarrassing number of them do.

On the other hand, the same sort of



categorization that has acted as a floor for sales has often acted as a ceiling, too. Plenty of potential readers *know*, *a priori*, that they don’t like SF, and they walk right by the SF racks, the way I, for example, would walk right by the gothics or westerns. So whereas a new novel by Harold Robbins or Norman Mailer or John Cheever has a potential audience of millions—anyone who goes near a bookstore—the audience for a science fiction book is pretty well limited to those who are willing to approach the SF corner of the store. Luckily a few novels, such as Frank Herbert’s *Children of Dune* and Arthur C. Clarke’s *Imperial Earth*, have wandered out of the SF corner and onto the general best-seller lists, but that doesn’t happen often—yet.

What to do? Label your book “science

fiction” and see it ghettoized in the bookstores, or take the label off and let it fight for survival out there in the main arena? My books have always been labeled and packaged as though they are science fiction, which (with the possible exception of *The Book of Skulls*) is what they are. This has probably been very dumb of me. Kurt Vonnegut, whose most satisfactory books seem very much like science fiction to me, insists he does not write science fiction, and his books sell in arload lots. Harlan Ellison, who sometimes writes SF and sometimes doesn’t, is another who lately has been keeping his books free of labels, and that seems to help sales, too.

I had one ugly experience with a novel called *Dying Inside*, which is about a telepath (and therefore is

Opinion

kovher SF, to me) but which is written in such a way that it could well appeal to a mainstream audience in search of offbeat novelty. The first paperback edition showed an oozing, repellent, loathsome thing that instantly identified the book as SF and was guaranteed to alienate any potential buyer who wasn't into monster-fic. Since the monster-fic fans didn't get their money's worth from the book either, sales were horrendous. For the next printing I demanded and got a much less science-fictional package, and the book has sold very nicely ever since, thank you, and evidently is reaching people outside the basic SF audience.

Perhaps if I had taken the words "science fiction" off the cover entirely, it would have sold even better, but I'm not sure of that. Even allowing for the recognition value of my name, I might well have lost a good chunk of the SF audience by disguising the book as pure mainstream. As I say, I'm not sure. The paradox of the packaging problem is difficult to resolve. There is comfort and security in having that basic SF audience to rely on; the trick is to reach the larger audience too, and there's no formula for that.

Except one. To write a book so immediate, so compelling, so fascinating, that it will go out and create an audience of its own. You can package dumb, awful space opera to look just like the latest mainstream best-seller, and after a possible initial sales spurt it'll still end up in oblivion, because the commodity it delivers to the reader is a worthless one and its readers will fail to generate the word-of-mouth excitement by which books ultimately are really sold. Or you can wrap a masterpiece so that it's indistinguishable from a third-rate imitation of Edgar Rice Burroughs, and the book will survive and prevail, because it's a masterpiece, even though its author may have some rough moments while waiting for the world to find that out. The presence or absence of monsters or robots or the words "science fiction" on the cover of a book have, I believe, only a short-term effect on that book's reception by the public.

Meanwhile there's this new one of mine coming out. (Not soon: I haven't even begun writing it!) The publisher has his theories about how to package and market it. So be it. The publisher, at this point, has more at risk in the project than I do, and knows more about the publishing game than I do. I'll write the book, and Harper & Row will issue it

forth upon the nation, and we'll see what happens. By the time it comes out, in 1980 or 1981 or thereabouts, it may even be feasible to call science fiction books science fiction, right there on the cover, and sell millions and millions of copies anyway. I hope so.

—G—

SF Answer Man

[continued from page 19]

their candidates for various positions on the *Gubnetra*. Would you please help us to stop these inquiries? The battlestar is severely short-handed due to the Cylon War, but (as anybody who watches the show can tell you) we do not hire actors.

Adama, Commander

Dear Adamus,

Thanks for making this information

available to our readers. I know they appreciate it.

—G—

Editorial

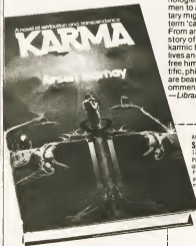
[continued from page 6]

colony or on the moon will require imaginative use of technology and judicious application of human power.

Science fiction's new vision of the future—a future without so many push-buttons—might serendipitously reduce the demand for powered superfluites. We hope so. In the meantime, we are going to rent an electric golf cart to go down to the Post Office and pick up the sacks of mail which this editorial will no doubt provoke.

—G—

Souls recycled here



What if the cycle of rebirth is disrupted by a machine that captures souls at the moment of death? And what if one of those souls has been followed for centuries in a brilliant plan for cosmic revenge? "From one angle, it is a horror story of humans enslaved by technologies fostered by desperate men to advance America's military might and provide for long-term 'care' of atomic wastes. From another, it is the engrossing story of three people locked in a karmic bind through successive lives and of one man's struggle to free himself... All aspects—scientific, philosophical, and human—are beautifully crafted. Highly recommended... (a) gem of a book!" —*Library Journal* \$8.95

At your bookstore or direct from

St. Martin's Press

175 Fifth Ave. New York, N.Y. 10001

Please send me _____ copy(ies) of KARMA

at \$8.95 each

Please include 75¢ per book to cover postage and handling (check or money order included)

Name _____

Address _____

City _____

State _____

Zip _____

OMNI

THE MOST SPECTACULARLY BEAUTIFUL NEW STAR
IN THE COMMUNICATIONS GALAXY

THE SCIENCE FICTION OF YOUR CHILDHOOD
IS THE SCIENCE OF TODAY

OMNI



THE REAL BIONIC MAN

INCLUDES INTERVIEW WITH NINA GOLD, R. PHILIP
ALLEN & THE UNUSUAL WORLD OF COMIC BOOK
BATHING MARGARET & A CONFESSION TO KILLERS

"I am vitally interested in the future, because I am going to spend the rest of my life there."

— Charles F. Kettering

You are invited to step into the future — your future — to savor every aspect of it, as it unfolds before you through the pages of a bold, new magazine — so visually stunning — so intellectually exciting — so extraordinarily an experience — that nothing remotely like it has ever existed before!

OMNI

What makes OMNI so special — so unique?

THE MOST BRILLIANT SCIENTISTS, THINKERS, AND WRITERS IN THE WORLD

Each stunning issue of OMNI will be bringing into your home — and into your life — the thoughts, the dreams, the accomplishments of the men and women who have changed the course of history

SAAC ASIMOV L. SPRAGUE
DE CAMP FRANK HERBERT
RAY BRADBURY HARLAN ELLISON
AND A.E. VAN VOGT

as well as the best of the exciting new writers

THE ULTIMATE IN MODERN ILLUSTRATION AND PHOTOGRAPHY

Visually OMNI will be a truly extravagant feast for the eye. Printed on heavy enameled paper, it will reproduce the genius of world-renowned illustrators and photographers — all in colors so true, so alive, that they will seem to jump off the page.

You'll find OMNI provides a window opening on the strange and exciting world of



MICHAEL FREEMAN

Space Colonies, Cloning, Machine Intelligence, Regeneration, Lasers, Computers, Extrasensory Perception, Black Holes, The Origin of Life, Genetic Engineering, Fusion, Solar Power, Time Dilation, Aging, Life After Death, Ultrasonics, Chemical Learning, Transplants, Geothermal Energy, Behavior Modification, UFOs and Other Extraterrestrial Phenomena, Tachyons, Holography, Weather Control, Anti-Matter, Superconductivity, Bionics, Microsurgery, Artificial Galaxies, Magnetic Bubbles, Future Farming, Dreams, Transmutation, Immortality, Molecular Clouds, Undersea Habitats, Interspecies Communication, Cyborgs, Nuclear Wastes, Storage Coding, Natural Pain Killers, Cosmology, Extraterrestrial Life. Come into the future with OMNI!



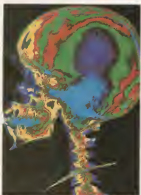
PAINTING BY CHRIS FUCHS

and transformed the world we live in. The roster of international luminaries who will be writing for OMNI or captured in revealing and candid interviews will include such notables as

ALVIN TOFFER, THOR HEYERDAHL, FREEMAN DYSON, RENE DUBOS, JACQUES-YVES COUSTEAU, DAVID BROWER, BARBARA MARX HUBBARD, ALTON BLAKESLEE, LEWIS THOMAS, I.J. GOOD, DAN GREENBERG, EDMUND O. WILSON, BUCKMINSTER FULLER, MARGARET MEAD

OMNI — THE FIRST MAGAZINE TO COMBINE SCIENCE FACT WITH SCIENCE FICTION

Each issue will also bring you the superb science fiction of recognized masters such as



ART BY GEMINI

OMNI CHARTER RESERVATION 25 PERCENT SAVINGS

OMNI Subscription Department
PO Box 908
Farmingtondale, N.Y. 11737

YES! Enclosed is \$8 for a one-year (12 issues) introductory subscription to OMNI of the special Charter Rate — a savings of \$6 under what others will pay at the newsstand or \$2.00 per issue.

Name _____
(Please Print)

Address _____

City _____ State/Prov _____

Zip/Postal Code _____

Payment Must Accompany Order

GCN78

Inquisition

Letters

DEAR EDITOR, I'm a long time science fiction buff—well, old. The forties had some fine magazines, some great stories, fine memories and they are a joy to reread in the current boom for my favorite fiction field. You are putting out a magazine that issue after issue has come up to the best of my memories. The stories are well written as literature, and definitely science fiction. The articles have been interesting, intellectually challenging, informative. Thanks—and good luck for the future: a long one, I hope, that will afford me the fun of rereading twenty years in both of our futures the excellent stories you are printing today.

Francine K. Lufkowitz
Pittsburgh, PA

Dear Mr. Ryan,

I write to take issue with Eugene Potter ("The Children of Cain," *Galileo* #10). The scientific background in this story is pretentious but nonetheless inaccurate and I am surprised at *Galileo* for publishing such a story.

From the first page, this story is on shaky ground. The time-traveling explorer claims to have observed 67 new varieties of "bovid" (why not bovidae?) in the Lower Pleistocene. There are only about 115 species of the bovidae known today! Does the author suppose there were at least 50% more varieties of antelopes, buffalo, sheep, and the like in the Lower Pleistocene than there are today? Don't you think this is rather unlikely?

Next, the explorer tells the guardian that archaeologists in her own time have

discovered fossil remains of all the 50 guardians which inhabited the Lower Pleistocene. Have you any idea how rare it is for anything to be fossilized? The mineralization of organic materials requires a confluence of circumstances any one of which is rather unlikely. An archaeologist will tell you that it is a virtual miracle to have one fossil specimen of a given animal. To have the unlikely conditions necessary for fossilization occur in every case for a widely distributed group requires more than "a willing suspension of disbelief." It requires the willing embrace of gullibility.

Finally, the explorer refers to entering a "pluvial" in her time-traveling explorations. Come on, now. A pluvial is a rainy period. She claims to be doing her fieldwork in savanna-grassland! Pluvial conditions would have created a heavily forested landscape.

These deficiencies jump right out at the average reader. I think you should tell Mr. Potter that if he wants to make a living as a science fiction writer, he needs more than a copying machine and a library consisting of *African Genesis* and 2001.

The rest of the magazine is pretty good. I like the reviews especially.

Henry Silverman
Cambridge, MA

Up to 1973, paleontologists had identified 143 varieties of Pleistocene bovids from Australopithecine sites alone. These specimens comprised five subfamilies and seventeen tribes and do not even include scores of indeterminate (but obviously bovid) remains. It is difficult for the modern mind to comprehend the richness and quantity of bovid life on the Pleistocene savanna, most of which was somehow wiped out in the latter part of that age.

As for fossilization, the bones of guardians contain such a high concentration of calcium that it would be very surprising if some little part of each individual (and the *A. robustus* specimens are all very fragmentary) had not been preserved. This "fact" never came out in the story, since the piece was told from the point of view of a person who had no way of determining the chemical composition of the guardians.

"Pluvial" is a short-hand term used by paleontologists to denote a geological horizon formed during a "wetter" period than those to either side of it. All things are relative, and a pluvial in East

Africa (which has had many pluvials and has remained savanna grassland through all of them) need not produce a tropical rainforest. As a matter of fact, my own analysis of associated fauna (based on published site reports) from the East African australopithecine sites points overwhelmingly to a grassland environment (hence the presence of large numbers of bovids). Most of these sites date from pluvials.

—Eugene Potter

Dear Mr. Ryan:

I wonder if you could provide more information about author James Lester ("A Song of Life," issue #10). The story is very much the same as one by the Icelandic science fiction writer, Thorkel Fringe. Fringe's work was published under the pseudonym Bjorn Gunnarson, a name his publisher thought more marketable. The story appeared in his episodic novel, *The Blue Planet*, the title of which was poorly translated in this country as *Island of Tomorrow* when they both appeared in the 1930's. I happened to read the book while staying with my grandparents in Reykjavik this past summer, and I wonder if Mr. Lester will admit to his influence.

Anthony Maxwell
Chicago, IL

Sorry. It must be a matter of simple coincidence. I have never heard of Fringe.
—James Lester

Editor's note: in answer to the more than one thousand letters received concerning our erratic schedule this past year, please read the "Publisher's Notes" on page 4, and accept our most sincere apologies. We will be doing everything in our power to make amends on an editorial level in the coming months. Thank you for your concern and patience.

Reviews

[continued from page 137]

processes, physical systems adapt to different states of consciousness. Jessup's research originates with the study of schizophrenics. Schizophrenia, he posits, may simply constitute a different state of consciousness rather than a disease; more importantly, that state of consciousness may explain, in some way, documented physical differences between schizophrenics and "normals."

In order to verify his hypotheses, Jessup explores two consciousness-altering procedures. The first involves

confinement in an isolation tank. A subject is deprived of external sensory stimulation and, after some time, usually experiences intense sensory excitement and hallucinatory episodes. The second procedure involves an ancient Mexican drug. The mixture possesses the singular property that all who smoke it experience the identical primal hallucination; furthermore, repeated usage does not alter the content of the hallucination.

In terms of plot, *Altered States* represents the werewolf fable in 1970s clothing. Indeed, one is reminded somewhat of the opening scenes in Mel Brook's *Young Frankenstein*, in which creation of the monster gains credibility in the context of the latest medical technology—of course there with comic intent. But *Altered States* poses deep moral and philosophical questions about the essence of man and his search for truth. Underlying the entire novel is Jessup's willingness—no, compulsion—to trade the love of his wife and children for a shot at a Nobel prize. Jessup ultimately concludes, "The final truth of all things is that there is no final truth! Truth is what's transitory. It's human life that is real! Truth is the illusion! Life is the only substance we have!" But Emily, Jessup's wife, knows—as does the reader—that Jessup is expressing half-truths at best, for the essence of man and his search for truth cannot in any meaningful way be separated.

Altered States has obviously been well researched and, given the story line's rapid acceleration into science fiction in its latter stages, could not have been more convincing. Paddy Chayefsky's command of molecular biology, psychophysiology, physical anthropology, paleontology, and several other disciplines, as displayed throughout the novel, is truly remarkable. The problem is that, despite the assertive style and supportive research, the credibility of the novel ultimately requires a substantial leap of faith, one that is far too broad for this reviewer. In addition, Jessup's inexplicable rescue through his wife's love compromises the scientific construction of the novel which Chayefsky has taken such pains to create. Nevertheless, the entertainment value alone is sufficient to recommend *Altered States*, and the vivid characterizations, snappy dialogue, and persuasive prose make this less-than-200-page novel easy to consume at a single sitting. —G—

Superman (continued from page 129)

has a nemesis, Lex Luthor (Gene Hackman), a mad scientist genius whose penchant for peculiar real estate deals endangers the entire west coast. Aided and abetted by his two henchmen, Eve Teschmacher (Valerie Perrine) and Otis (Ned Beatty), Luthor not only is determined to destroy Superman but also plans to turn his Death Valley acreage into beach-front property by activating the San Andreas fault via an atomic missile. In a tense finish Superman must grapple with a Kryptonite trap, stop atomic missiles from razing the west coast and New Jersey, save an endangered school bus, contain a flood, repair collapsing dams, stop an earthquake, and save Lois Lane from death.

Much of the credit for the movie's success belongs to the performance of Christopher Reeve as Superman/Clark Kent. A relative unknown, Reeve managed to retain some semblance of seriousness and respect for his role and delivered a very witty and underplayed performance as both the heroic Superman and the bumbling Clark. He successfully convinces the viewer that Superman is a real person who just happens to be a superhero, yet at the same time his enthusiasm for his part is a critical factor in the audience's enjoyment of the film.

Reeve's excellent performance is supported by Margot Kidder's Lois Lane. Milking the role for all the humor it could hold, Kidder's comic timing complements Reeve's more serious performance. Besides investing Lois's character with a bite and depth that such a stock character generally lacks, Kidder constructs a personality for Lois that actually makes her a plausible romantic interest for the "Man of Steel."

The remaining credit for the film's success goes to the special effects. The destruction of Krypton managed to carry the viewer's interest even through the most boring parts of the film, while the flight scenes and disaster sequences contributed to the entire fantasy element of the movie. Superman really can fly, leap over tall buildings, and outrun locomotives—or at least he can do these things with the assist of Colin Chilvers's crew of special effects wizards.

Superman, The Movie, is not a perfect film, but it's the most entertaining film I've seen since *Star Wars*. It's proof that movies can, too, be fun. —G—

Classified

From bazaar to bizarre

50 cents per word based on guaranteed
sales of 100,000/ten word minimum.

PUBLICATIONS

SF SWOP CLUB. Send 10 paperbacks with \$2.00 shipping & handling. Receive 10 different books. Dan McCue, 8120 Burtonwood, Citrus Heights, CA 95640.

BOOKS BY DAVID A. WILSON: *The Third World War*—a protest in poetry—\$1.50 ppd. *The Push*—scenes reflecting the totality of the experience of man—\$2.50 ppd. Loren House, P.O. Box 1112, Black Mountain, NC 28711.

ALGOL, THE MAGAZINE ABOUT SF. Color covers, 16th year of publication. Hugo Award winner. Pohl, McCaffrey, Suzy McKee Charnas, Richard Lupoff in Winter issue. \$2.25, 1 year \$8 ALGOL Box 41750, New York, NY 10017.

NON-SEXIST SF zine. Paying 1 cent/wd for stories. Sample copy \$1.40 issue sub \$3.50. Pandora, 1150 St. Paul St., Denver, CO 80206.

THE BOOK OF ELLISON. 200 page quality paperback with 35,000 words by Ellison, 25,000 words of praise and retrospection by Gerrold, Asimov, Silverberg, etc. \$5.95 plus \$5.00 postage ALGOL Press, Box 41750, New York, NY 10017.

SUPERZINE. founded March 4, 1978, the newsletter for comic collectors, has free ads from collectors across the nation. 6 monthly issues, \$1 from Chris Lareau, 2018 Commonwealth Avenue, Brighton, MA 02135.

NOW AVAILABLE TO NON-MEMBERS: *The Bulletin of the Science Fiction Writers of America*, \$10 Annually/6 issues. John F. Carr, editor, 10512 Yarmouth Ave., Dept. GL, Granada Hills, CA 91344.

THRUST—SF IN REVIEW #11 features Sturgeon, Haldeman, Cherry, White, Sheffield. Satisfaction guaranteed! If you don't agree that *Thrust* is SF's best magazine about science fiction, return your copy for full refund! \$1.50, 4/\$5.00, *Thrust* Publications, Box 746, Adelphi, MD 20783.

NEW WORLDS. Most radical magazine in the field. Birthplace of science fiction's "new wave": Aldiss, Ballard, Delany, Ellison, etc. Now following another new direction—totally different, unpredictable. Latest issue (#214) features Moorecock, Platt, Spread, others. Large format, 52 pages. Simple: \$1.50 payable to Patchin Productions, Room 718, 41 Union Square, New York, NY 10003. Or: \$5 for next four issues.

PUBLISHING INTERNSHIPS. *Galileo* Magazine is looking for people interested in publishing careers. Volunteers are needed for paste-up, copy-editing, typesetting, and a multitude of clerical tasks. We expect a commitment of at least three months, for a minimum of ten hours a week. Write or call Galileo, 139 Newbury Street, Boston, MA 02115.

CATALOGUES

BACK ISSUE MAGAZINES. Over 200 titles—1890 to 1978. Free List. Send Stamped Envelope. Everybody's Book Shop. Dept. GE, 317 West 6th, Los Angeles, CA 90014.

REMEMBER RADIO SCIENCE FICTION??? Original radio broadcasts—records & tapes!! Publ. Asimov, Bradbury, Heinlein, Sturgeon. Catalogue \$1.00. Catalogue + full-hour broadcast: \$3.95!! Specify Cassette/8-track/Record. American Radio (G2), Box W, Culver City, CA 90230.

EVERYTHING IN SF and Fantasy. Send \$3.50 for 60-page catalog. Collections also purchased. R.A. Madle, 4000 Bestor Dr., Rockville, MD 20853.

ILLUSTRATED CATALOG OF SF, fantasy art and film publications. Over 1500 different items including books, fanzines and posters. Dealers! Wholesale is my specialty. Send your letterhead for free Discounts Package. Fans Send \$5.00 for Catalog. Bad Plant, po Box 1840Q, Grass Valley, CA 95945.

MISCELLANEOUS

A CONSTITUTION FOR THE FEDERATION OF EARTH—60y detailed and scholarly pages. \$5.00. Science Activities, Box 125, Massapequa, NY 11778.

PRINTING SERVICE AVAILABLE. Details \$1.00. Steven Herr 6229 N. W. Hwy, Chicago, IL 60631.

GRANTS AND AID for individual artists, arts—1800 sources. Stamped envelope for brochure. WIAL, Box 9005G, Washington, D.C. 20003.

HANDY GIANT TOTE BAG 15 x 13 x 5. Natural Colored Linen, Saddle Trim, Red, Green Stripe. Down Center \$10.95, J&M Gifts, 12206 Janine, Chicago, IL 60643.

U.F.O. Research Organization: members wanted—for information write: SHADO, Dept. G, P.O. Box 1379, Greensboro, NC 27403.

SCARCE out of print, and new fantasy & science fiction books and magazines. We will search for books. Catalogues issued. Star Trader Books, 434 West Pender, Vancouver, B.C. Canada V6B 1T5.

IMPERIAL TRADING POST, 1468 Halekua Drive, Honolulu, Hawaii 96821. 20" x 30" 5c-6c photos. Also vinyl slides, SF trade books, and custom made posters and slits. Send self addressed stamped envelope for list.

UNDERGROUND COMICS—6 different science fiction undergrounds—including the new *Chocolate Alphabet* by HARLAN ELLISON. Total package \$6.50 postpaid. Also available *DOPE* or *SEX* undergrounds. Send SASE for complete listing. NEWBURY COMICS, 268 Newbury St., Boston, MA 02116 (3 blocks from the publishers of *Galileo*).

SIGN OF THE UNICORN, a special store for lovers of fantasy & science fiction jewelry, sculpture, & art. Our beautiful collection of sterling silver includes unicorns, dragons, griffins, "puppets," "little faeries," "fire dragons," "Golems," and other fantastic creations. We specialize in custom orders. Please visit our shop on Cape Cod. Sign of the Unicorn, Route 8A (Box 965), Brewster, MA 02631. (617) 896-5729. Mail inquiries welcomed, catalogue—25 cents.

SUPERNATURAL HOLY SPIRIT PHOTO not painted by human hands. Strange, fantastic, unbelievable, incredible, amazingly absurdly quaint: Transcendental Godhead poetic head in the clouds. Miraculous Spiritual Phenomena. 2c5 \$1 + SASE. A. Allen, 39 Grantwood Lane, Grantwood, MO 63123.

\$1200.00 MONTHLY Correcting Pupils' Lessons!!! Start Immediately. Free Report. Send self-addressed stamped envelope. Home, Box 9201-SLS, San Diego CA 92109.

HOMEWORKERS! Earn \$8y5 Stuffling envelopes. Free Details, SciCo, 624G Augustus, Elgin, IL 60120. **INTERVIEW GEORGE HOMERO** (director, *Night of Living Dead*, *Kaufman's Body Snatchers*, *Stephen King*, androgyny, news/reviews—films, records, television, comics, fanzines. *AJTA* #3)—\$2.00. 47 Crater, Wharton, NJ 07885. **SCIENCE FICTION BUTTONS,** nee-posters, etc. Original *War of the Worlds* soundtrack in cassette, 8 track, or 2 record set: \$10.50 post paid. Catalog \$1.00. Specialty Wholesale Mdr, P.O. Box 18464, Milwaukee, WI 53218.

\$1200.00 MONTHLY Correcting Pupils' Lessons!!! Start Immediately. Free Report. Send self-addressed stamped envelope. Home, Box 9201-SLS, San Diego CA 92109.

THOUSANDS OF SCI-FI, other books. Paperbacks and hardbacks. Send size, \$1.00 to: Harley's Books, 1902 West Erwin, Tyler, TX 75702.

THRU BLACK HOLES Space and Fantasy magazine. Fantastic Pen & Ink Space-artwork. Articles and Space news. Poetic wordings & an electronic musicians review. Produced by Michael Roden. Co-Edited by: Ron Nance, Dave Griffiths (UK), & Michaelase P. Llewellyn. 40+ pages, available bi-monthly for \$7.50/6 or \$11.91 sample issue. Thru Black Holes, 982 White Oak Road, Cincinnati, OH 45245.

HOW TO GET RICH ENJOYING YOURSELF! I will show you seven ways to do so. Young, 1713 Douglas, Lake Worth, FL 33460.

HOW TO BUILD AN ESP MACHINE! That really works! Amazing psychic power instantly! Simple \$25 electronic device anyone can build. Used by European psychics. Details True, Box 195, Hancock, WI 54943.

BE PREPARED FOR SPACE with your silver Lunar Passport with Credit card, Space Utility Kit featuring Moonspoon, and Astrological predictions. DON'T LEAVE EARTH WITHOUT IT! Send \$3.95 to Lunar Services Ltd., 309 W. 29 Street, New York, NY 10001. N.Y. Residents add \$3.32 sales tax.

Star Chamber

Hal Clement

WE AT *GALILEO* are counting our lucky stars—Harry Stubbs has joined our staff as Science Editor. Whoops, who? Harry Stubbs does not mind the fact that most fans know him by his pen name, Hal Clement. A Chemistry and Astronomy teacher, Hal originally adopted his pseudonym because his school objected to his writing SF. Since then, the pen name has become a persona, a conscience for scientific consistency in the science fiction community. We expect he'll insist on the same high standards here as he has for himself since his first publications appeared in *Astounding* in 1942. That was only the beginning. His work reached its ascendancy in the period 1949-1957, when *Astounding* serialized *Mission of Gravity*. It was issued in its entirety by Doubleday in 1954 and is still in print making it one of the more durable and exemplary works of SF. Hal Clement is also well known at conventions, and recently he has exhibited his fine paintings, as scrupulous in their attention to scientific detail and consistency as his written work. Whether you read one of his stories or look at one of his paintings, you can almost feel him back there with his slide rule, figuring the precise pull of gravity on an alien planet. His experience, scientific knowledge, and many talents, will be invaluable to us, and he will undoubtedly make a major contribution toward *Galileo's* aim to be the finest SF Magazine around today. Welcome aboard, Hal!



"Phil Clement"

Harry (Stubbs)



396

